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Tempo of a mega-henge: a new chronology for Mount Pleasant, Dorchester, Dorset

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Abstract

Radiocarbon dating and Bayesian chronological modelling has provided precise new dating for the henge monument of Mount Pleasant in Dorset, excavated in 1970–1. A total of 59 radiocarbon dates are now available for the site and modelling of these has provided a revised sequence for the henge enclosure and its various constituent parts: the timber palisaded enclosure, the Conquer Barrow and the ditch surrounding Site IV, a concentric timber and stone monument. This suggests that the henge was probably built in the 26th century cal BC, shortly followed by the timber palisade and Site IV ditch. These major construction events took place in the late Neolithic over a relatively short timespan, probably lasting 35–125 years. The principal results are discussed for each element of the site, including comparison with similar monument types elsewhere in Britain and Ireland, and wider implications for late Neolithic connections and later activity at the site associated with Beaker pottery are explored.

Dorchester Neolithic monument complex

[Figure 1]

Between the Rivers Frome and South Winterbourne in Dorset, in the area of the Roman and modern town of Dorchester, are the remains of a cluster of monuments that formed a major Neolithic ceremonial complex (Fig. 1). The largest and most architecturally complex component was the henge and palisade at Mount Pleasant. The sequence of construction and activity at this site is crucial to understanding the wider Dorchester complex, as well as developments in late Neolithic southern England as a whole. Bayesian chronological modelling, incorporating 39 new radiocarbon dates, is presented in this paper, with the new constructional sequence sited within the context of analogous monumental activity across late Neolithic Britain and Ireland.

Mount Pleasant forms a pivotal node within the wider Dorchester Neolithic complex. Excavations through the 20th century have revealed the components of several key monuments in this complex, although the precise chronology of these sites remains poorly understood. Early Neolithic activity is shown by pits and scatters of pottery (Woodward 1991, 43; Smith *et al.* 1997, 30; Davies *et al.* 2002, 1, Wessex Archaeology 2018). The earliest monument to be built was the causewayed enclosure at Maiden Castle, constructed on a wooded hilltop in 3695–3640 cal BC (95%

probability; Fig. SI1.b; *dig Maiden inner*¹), probably 3670–3640 cal BC (68% probability). Of the numerous long and bank barrows in the area (see Riley *et al.* 2008) only the unusual example at Alington Avenue has been excavated in modern times (Davies *et al.* 2002). Here, the 75 m long parallel ditches, dug 14–16 m apart, did not appear to enclose a substantial mound and no trace of funerary activity was discovered. A relatively late date is suggested by a radiocarbon determination from a cattle skull deposited in the ditch of 3370–2900 cal BC (2 σ ; HAR-8579, 4450 \pm 80 BP; Davies *et al.* 2002, 17).

Alington Avenue long barrow was one of several monuments constructed along the ‘Alington ridge’, a low-lying rounded ridge of Upper Chalk which runs east–west parallel to the River Frome. Immediately to the east was Flagstones, a 100 m diameter circular enclosure of unevenly spaced pits, where several adult cremations and child inhumations were interred (Healy 1997). Current estimates date the construction of Flagstones enclosure to 3365–3160 cal BC (95% probability; Whittle *et al.* 2011, 192, fig. 4.48: *build enclosure*) although the chronology of the site is not precisely understood. The site has similarities to other ‘proto-henges’ that were the location of cremation cemeteries, including the earliest phase of Stonehenge and Llandygái A, Gwynedd (Noble & Brophy 2017). To the west of Alington Avenue stood Greyhound Yard, a large timber palisaded enclosure about 380 m in diameter surrounding a dry coombe which runs north to the River Frome (Davies & Farwell 1989; Woodward *et al.* 1993). Radiocarbon dates from the site suggest that it was constructed in the mid-3rd millennium cal BC (Bayliss *et al.* 2017, fig 17.16a–b). To the south of Greyhound Yard lies Maumbury Rings, an unusual henge monument consisting of a circuit of about 45 shafts, dug 9–12 m deep into the chalk, measuring around 52 m in diameter (Bradley 1975). The two available radiocarbon determinations suggest a mid-third millennium cal BC date for its construction (Bradley 1988, 160). Radiocarbon dating of material from Alington Avenue, Flagstones, Maumbury Rings and Greyhound Yard is currently being undertaken, with further planned publications situating Mount Pleasant within the chronological sequence of the Dorchester ceremonial complex.

Mount Pleasant henge

Mount Pleasant is a monument with multiple components; henge enclosure, concentric timber and stone structure, palisaded enclosure and large round mound. No doubt other features or evidence for occupation remain to be discovered or have been lost to the plough. These elements drew on an established repertoire of monument construction and deposition seen at other large henge enclosures in southern central England and at contemporary monument complexes elsewhere in Britain and Ireland.

[Figure 2]

Mount Pleasant is located on the eastern edge of the modern town of Dorchester, lying about 400 m south of the current course of the River Frome. Since at least the 1850s, the site has been (and remains) under arable cultivation (Barber 2014, 8). The enclosure is an irregular oval enclosing a domed area around 370 m east-west and 320 m north-south (Figs. 2 and 3). Due to its large size, Mount Pleasant has often been classed as a ‘henge enclosure’ or ‘mega-henge’ along with Avebury, Durrington Walls and Marden, all in Wiltshire, and Knowlton in Dorset (eg Harding 2003, 119; Sheridan 2004, 35). Although there have been several reinterpretations and discussions of the construction sequence at Mount Pleasant since Wainwright’s initial excavations in 1970 and 1971 (Pollard 1992, Barrett 1994, Thomas 1996, Needham 2006, Harris and Sørensen 2010) as well as aerial photographic analysis (Barber 2014) and recent geophysical survey (Linford *et al.* 2019), the only subsequent excavation has been a watching brief along the route of a pipeline to the south (Woodward 1986). Whilst other ‘mega-henges’ such as Durrington Walls and Marden have seen extensive new research excavations in recent years (Parker Pearson 2007; Leary and Field 2012), the sequence at Mount Pleasant has remained reliant on the stratigraphic phases proposed by Wainwright and their associated radiocarbon dates.

[Figure 3]

The henge enclosure is defined by a poorly preserved bank represented by a layer of chalk lumps 10 m wide, and corresponding irregular ditch (Wainwright 1979, 35, 38; plates XIXa and b; Linford *et al.* 2019). Four entrances were initially identified, but a fifth to the south-west is now known, the causeway occupied by a series of large irregular pits (Barber 2014, 25; Linford *et al.* 2019, 11; see Fig. 2). These may represent a blocking or restriction of the entrance, as attested at henges elsewhere (e.g. Ringlemere Farm, Kent (Parfitt & Needham 2007, 46–7) and Forteviot Henge 2, Perth and Kinross (Brophy & Noble 2012, 29)). Alternatively, these irregular pits may indicate the presence of an earlier circuit dug prior to the construction of the main henge (Barber 2014, 41), an interesting possibility given the recent discovery at Durrington Walls of a circuit of large timber posts pre-dating the henge bank (Parker Pearson *et al.* 2017). To the east of Mount Pleasant lies a sunken, straight ‘approach’ feature (Fig. 3) which may form an avenue or roadway leading towards a fording point of the river (Barber 2014, 35), again comparable with a similar feature at the east entrance to Durrington Walls that connects it to the River Avon (Parker Pearson *et al.* 2008).

[Figure 4]

[Figure 5]

Within the henge enclosure stood a concentric timber and stone monument, Site IV, consisting of five rings of postholes, a central square setting of stones and posts, and several outlying standing stones (Figs. 4 and 5). This structure was surrounded by a circular ditch 43 m in diameter with a

single causeway to the north and, from the evidence of chalk rubble filling within the ditch, probably with an external bank (Wainwright 1979, 10). It has been suggested that this ditch may have been preceded by a series of pits (Barrett 1994, 101; Needham 2006, 18).

Within the Site IV ditch fills at various places around the circuit were many large and fresh flakes of sarsen stone, as well as three hammerstones, associated with Beaker pottery. Radiocarbon dates obtained on charcoal from these upper fills (BM-668, BM-669 and CAR-5) were interpreted as providing an estimate for the construction of the stone settings (Wainwright 1979, 28) but as Pollard (1992, 22) has argued, this debris could have easily resulted from the breaking and removal of the stones, rather than their initial erection.

[Figure 6]

Situated roughly concentrically within the henge enclosure was a timber palisade consisting of an estimated 1600 posts set into a trench 1–2 m wide and between 2.5–3 m deep (Wainwright 1979, 45). In addition, within the north-west quadrant of the enclosure aerial photographs and geophysical survey show the presence of a partial inner palisade (Barber 2014, 29; Linford *et al.* 2019, 12). The posts of the main palisade perhaps stood 6 m high, based on an estimate of one third of the length of each post being below ground level and were likely to have been oak (Wainwright 1979, 50, 253). Two narrow entrances into this enclosure were discovered on the northern and eastern sides (others may exist); each was flanked by enormous posts 1.8 m in diameter. Some sections of the palisade had been destroyed by fire, in other places the posts decayed *in situ* and elsewhere they were deliberately removed (Fig. 6). The palisade was estimated to have been constructed in the early Bronze Age, based on three radiocarbon dates (BM-662, BM-665 and BM-794, see Table 1). This is later than would be expected for a palisaded enclosure (Whittle 1997, 158–60) and seems at odds with the carved chalk objects and Grooved Ware pottery found in the palisade trench (Wainwright 1979, 79–82, 167). The charcoal sample (BM-665) came from a deposit of burnt material near the top of the palisade ditch and may therefore derive from fuel used to burn the structure, rather than a palisade post.

Close to the western entrance of the henge enclosure is a large round mound known as the Conquer Barrow, standing 7 m high and 30 m in diameter. Several investigators noted that the mound appeared to lie on top of the henge bank (Crawford in Piggott & Piggott 1939, 158; RCHME 1970, 591; OS card record, Historic England Archive). Wainwright followed this interpretation, recognising the mound as 3–4 m high above a surviving 4 m tall remnant of the henge bank (Wainwright 1979, 65). The Conquer Barrow today is heavily overgrown and lies partly in private gardens, making further assessment of the earthworks difficult. Excavations have revealed that the mound was once surrounded by a ditch which stopped short of the henge enclosure ditch to the

south. On the northern side, the relationship between these two elements was not investigated, nor was the mound itself. An antler pick from the primary chalk rubble of this ditch was radiocarbon dated (BM-795) but the result was rejected as residual, being much earlier than expected given the clear earthwork sequence (Wainwright 1979, 65). Others have since questioned this, as there is no obvious reason to reject this date (Woodward 1991, 136–40; Sparey-Green 1994; see Barber *et al.* 2010, 157–63). Although Sparey-Green (1994, 53) has argued that the angular chalk in the segment of the barrow ditch closest to the henge indicates infilling prior to the construction of the henge, this could equally derive from much later levelling of the henge bank and does not provide conclusive evidence. If the Conquer Barrow is of Neolithic date, then it can be placed in the category of late Neolithic round mounds alongside Silbury Hill, Hatfield Barrow at Marden, Great Barrow at Knowlton (Barber *et al.* 2010) and Marlborough Mound (Leary *et al.* 2013). At present, the interpretation of the earthworks provides the best guide to the sequence, with the henge bank preceding Conquer Barrow.

Aims of the dating programme

A total of nineteen radiocarbon measurements were obtained on material from Mount Pleasant from the British Museum laboratory between 1971–4 (see Table 1) and a single measurement from the University College, Cardiff laboratory in the mid 1970s (Dresser 1985). This was an extensive programme of radiocarbon dating for the time, and the results were influential on Wainwright's interpretation of the sequence. For example, dates obtained from two antler picks excavated from the western entrance ditch (BM-645 and BM-646) were in the region of 200–300 years later than charcoal samples from the northern entrance ditch terminals, leading Wainwright to conclude that the western entrance ditches had been extended after their initial construction (Wainwright 1979, 44). However, the existing chronology has a number of interpretative issues, either because of the amount of material required for radiocarbon measurement at that time (bulked samples) or the samples selected (unidentified charcoal potentially affected by an 'old wood' effect or material obtained from contexts not directly related to archaeological questions of interest).

The aim of this project was therefore to obtain a robust chronology for Mount Pleasant. More specifically, the objectives were to provide precise date estimates for:

- * The construction of the henge ditch, including whether the western entrance had been extended.
- * The construction of the palisade enclosure.
- * The digging of the Site IV ditch.
- * The sarsen breaking and burning layer in the Site IV ditch.
- * The infant burials in the upper fills of the henge ditch.

Unfortunately, no suitable material for dating survives from the timber structure of Site IV or the Conquer Barrow ditch. The sampling strategy also aimed to evaluate the existing measurements by submitting new samples from the same contexts where possible.

Radiocarbon dating and chronological modelling

The new radiocarbon dating programme for Mount Pleasant was conceived within the framework of Bayesian chronological modelling (Buck *et al.* 1996). This allows the combination of calibrated radiocarbon dates with archaeological prior information using a formal statistical methodology. At Mount Pleasant a limited number of stratigraphic relationships between structures and between the fills of ditches were available to constrain the radiocarbon dates.

The Mount Pleasant archive is held at Dorset County Museum in Dorchester. Unfortunately, the animal bone, at some point during or after its analysis for publication, has been re-organised into species type and broad time period, so that it is now impossible to assign the bones to their original contexts. The remainder of the material from the site is in good condition and, except for an infant burial from the northern entrance of the henge ditch (Cutting XXVIII) which had been treated with preservative, was suitable for radiocarbon dating. Large amounts of wood charcoal had been retained, particularly from the burnt posts of the palisaded enclosure; where oak was selected for radiocarbon dating, sapwood was preferentially selected. Wood identifications were carried out to genus level, using the key and descriptions by Schweingruber (1990).

[Table 1]

Results and Bayesian chronological modelling

A total of 59 radiocarbon measurements are now available from Mount Pleasant (Table 1; SI2i). All are conventional radiocarbon ages (Stuiver & Polach 1977). The chronological modelling described in this section has been undertaken using OxCal 4.3 (Bronk Ramsey 1995; 2009; 2017) and the internationally agreed calibration curve for the northern hemisphere (IntCal13; Reimer *et al.* 2013). The model is defined by the OxCal CQL2 keywords and by the brackets on the left-hand side of Figs. 7–10. In the diagrams, calibrated radiocarbon dates are shown in outline and the posterior density estimates produced by the chronological modelling are shown in solid black. The Highest Posterior Density intervals which describe the posterior distributions are given in italics.

(Figures 7–10).

The models

The chronological model for Mount Pleasant is defined in Figs. 7–10, and the Highest Posterior Density intervals for key parameters are given in Table 2. This is based on the stratigraphic sequence revealed through excavation. The relationships that are included in the model are summarised in Figs. SI2.a–c. This model has good overall agreement (A_{model} : 98; Figs. 7–10).

The henge

Four samples, three single fragments of charcoal from short-lived tree taxa and a bulk sample of *Quercus* sp.² charcoal have been dated from the buried soil preserved beneath the bank of the henge enclosure. Fifteen samples have been dated from the henge ditch, six from the western and nine from the northern entrance. From the western entrance measurements are available on five antler picks from the bottom of the ditch or its very earliest silting; of these, the two British Museum measurements (BM-645–46) are considerably younger, >300 BP, than the three more recently AMS dated samples (which are statistically consistent ($T'=2.3$; $T'(5\%)=6.0$, $v=2$; Ward & Wilson 1978; Table 1). These two British Museum dates therefore appear to be inaccurate and have been excluded from the model. The British Museum measurements were made prior to the widespread introduction of formal approaches to quality assurance, through a series of ongoing international laboratory inter-comparison exercises with published results (Otlet *et al.* 1980; Rozanski *et al.* 1992; Scott *et al.* 1990; 2010; Scott 2003). There have also been significant improvements in the pre-treatment methods used for bone samples since the early 1970s (Longin 1971; Law & Hedges 1989; Brown *et al.* 1988).

A sample of bulk charcoal (BM-664) from the aeolian derived upper fill (Layer 3) of the north terminal of the western entrance of the henge ditch could have an unknown-age-at-death offset (Bowman 1990). It has therefore been incorporated as a *terminus post quem* (TPQ) in the model.

A series of nine samples form a stratigraphic sequence through the fills of the eastern terminal of the north entrance of the henge. The results from six samples of bulked *Quercus* sp. charcoal from Layers 6–8 and 10–12, have been incorporated as *termini post quos* (TPQ) in the model given the potential for them to have a significant age at death offset. Two antlers (SUERC-72738 and Cutting XXIX: Layer 11) from the primary silting of the ditch are statistically consistent ($T'=0.8$; $T'(5\%)=3.8$, $v=1$). An infant burial (OxA-35740) cut from the base of Layer 8 into Layer 9 in the east terminal is Iron Age in date, surprisingly late given that Layer 9 represents the relatively low filling of the ditch. This is perhaps because the burial was near the centre of the more than 10 m wide ditch which would have eroded and infilled initially from the sides. It is likely that a second, undated, child burial cut from the same level in this part of the ditch also dates to the Iron Age. The measurement has been excluded from the model because the inhumation does not contribute to understanding the Late Neolithic chronology of the henge.

The Conquer Barrow

A single antler pick (BM-795) from the primary chalk rubble of the Conquer Barrow's ditch is interpreted as deriving from its digging and therefore in the absence of any further available samples provides a credible date for its construction, assuming that material from this ditch was used to build the mound. Given the sequence indicated by several observations of the earthworks (see above), it is accepted here that the construction of the barrow took place after the construction of the henge enclosure bank. Alternative readings of the relationship between the earthworks of the henge enclosure and the Conquer Barrow are presented in SI3, with discussion of the chronological implications for the Mount Pleasant sequence.

Site IV ditch

A minimum number of 11 antler picks, all with worn tines and occasional signs of battering behind the burr, were recovered from the Site IV ditch. A British Museum measurement (BM-666) on antler from Segment VII Layer 10 is statistically consistent with AMS measurements (UBA-34290 and SUERC-72731) on a further two antlers from this layer ($T'=4.5$; $T'(5\%)=6.0$, $v=2$). These results imply that the inaccurate measurements identified on antlers from the henge ditch (BM-645–46) and palisade (BM-662) might not be the result of a systematic British Museum laboratory problem such as that identified between 1980–1984 (Bowman *et al.* 1990). Although two further British Museum measurements on samples of *Quercus* sp. (BM-663) and *Bos primigenius* (BM-667) from Segment VII Layer 10 are statistically consistent with the three determinations on antler from this layer ($T'=5.7$; $T'(5\%)=9.5$, $v=4$) they have been included as *TPQ* in the model given the uncertainty over the taphonomy of the aurochs bone, and the possibility of age-at-death offset in the charcoal.

Six measurements on charcoal, one unidentified (CAR-5), two comprising bulked *Quercus* sp. (BM-668–9) and three short-lived single entity samples (ETH-92535–7) are from deposits relating to the secondary silting of the ditch. Given the potential for an old wood effect CAR-5 and BM-668–9 only provide *TPQ* for their contexts. The three determinations from Segment XIII, layer 5 (ETH-92535–7) are statistically consistent ($T'=0.6$; $T'(5\%)=6.0$, $v=2$) and provide an estimate for the deposition of Layer 5 with its burnt deposit containing quantities of sarsen stone.

In our preferred model the dated antler from Segment VII Layer 8 (Table 1; Segment VII: layer 8) has been interpreted as deriving from a recut of the ditch in this part of the circuit (Wainwright 1979, fig 10), where the south side of the ditch is angular and irregular with deposits below Layer 8 filling two of the irregularities³. Adding further weight to the existence of a recut is the fact that frequencies of chalk rubble in the pit and below Layer 8 are comparable with those in the basal fills of adjoining Segments VI and VIII (Wainwright 1979, figs 9–11) while in Layer 8 there is clearly

much less chalk rubble. In this reading of the stratigraphy the ‘pit’ (Wainwright 1979, fig 10) is interpreted as the remnant of an original ditch, not a pit surviving beneath the ditch-cut-line, that along with other possible examples might indicate an original circuit of pits or shafts (Needham 2006, 18).

Palisaded enclosure

From the palisaded enclosure a total of fifteen samples have been dated. Seven measurements are available on single fragments of *Quercus* sp. charcoal sapwood from three postpipes. In prehistoric English oaks the amount of sapwood varies between 10–55 years (Hillam *et al.* 1987) and thus the best estimate is provided by the latest dated sapwood for each post (*post_2*, *post_3*, and *south_pipe_11*; Fig. 10).

Thirty-eight antler picks were recovered from the chalk rubble packing material which had been placed around the timber uprights. The majority of these were from near the base of the ditch and showed extensive signs of wear consistent with them having been used to excavate the ditch containing the palisade. Of the six of these antlers that have been dated, the British Museum determination (BM-662) is again significantly younger than the more recently dated AMS samples (all five measurements are statistically consistent ($T'=8.9$; $T'(5\%)=9.5$, $v=4$). As the British Museum result would appear to be anomalous it has been excluded from the model.

A sample of *Quercus* sp. charcoal from Layer 3 (Cutting III), a deposit of carbonised material sealing the top of the palisade trench and stratigraphically above the packing material (Layer 5) could have an unknown age-at-death offset and therefore has been included in the model as providing a *TPQ*. The taphonomy of BM-794, derived from a selection of animal bone (unknown species) from the upper deposits (Layers 3–6) of the palisade trench in Cutting XVIII, is unknown but the sample probably represents material used to backfill this section of the palisade following removal of the posts (Wainwright 1979, 61). Given that the dated sample comprised bulked material that could be of different ages it has also been included as a *TPQ* in the model.

The two independent estimates for the completion of the palisade enclosure (*end_palisade_posts* & *end_palisade_antler*; Fig. 10) have combined (Fig. 11), based on the interpretation that they represent a single planned construction, to provide an estimate for its building.

[Figure 11]

A structural narrative

[Figure 12]

Although two of the four dated samples from the old land surface beneath the henge bank were associated with a substantial assemblage of early Neolithic Plain Bowl pottery, the date estimates clearly relate to carbonised material deriving from later activity. This activity is represented by Peterborough Ware scattered in the north-eastern part of the palisade trench, and by two transverse arrowheads and two sherds of Grooved Ware pottery found under the henge bank (Wainwright 1979, 77, 141). These indicate some activity prior to the construction of the earthwork enclosure, although as yet the late Neolithic evidence does not appear to be on the scale of comparable enclosures such as Durrington Walls.

The model shown in Figs 7–10 and summarised in Fig. 12 and Table 2 provide an estimate for the digging of the henge ditch of *2610–2495 cal BC (95% probability; build_henge; Fig. 12)*, probably *2580–2530 cal BC (62% probability)*, assuming a unitary construction for the henge ditch. The number of dated antler picks available from the enclosure ditch is insufficient to identify any difference in date between the two entrances. Following our preferred interpretation that the Conquer Barrow was built on top of the henge bank, the single dated antler from its ditch, *BM-795* provides an estimate for its building of *2580–2460 cal BC (95% probability; BM-795; Fig 12)*, probably *2525–2475 cal BC (68% probability)*.

The ditch surrounding Site IV is estimated to have been completed in *2555–2400 cal BC (95% probability; dig_site_IV_ditch; Fig. 12)*, probably *2515–2440 cal BC (68% probability)* in our preferred model. Alternative estimates resulting from different readings of the stratigraphy, following Wainwright (1979; Fig S13ii.k–n) and Needham 2006 (Fig SI3ii.o–r) suggesting that the ditch was dug in *2465–2345 cal BC (95% probability; dig_site_IV_ditch; Fig S13ii.m)* probably *2450–2390 cal BC (68% probability)* or *2465–2360 cal BC (95% probability; dig_site_IV_ditch; Fig S13ii.q)*, probably *2455–2405 cal BC (68% probability)*. The lack of any suitable dating material directly relating to the construction of Site IV timber structure means that this remains undated.

The palisade is estimated to have been built in *2560–2440 cal BC (95% probability; build_palisade; Fig. 12)*, probably *2530–2465 cal BC (68% probability)*, again assuming a unitary construction.

It is possible to determine the relative order in which the various parts of Mount Pleasant were built (Table SI2.a). For example, based on the available dating, it is *80% probable* that the henge enclosure ditch and bank were the first elements of the Mount Pleasant complex to be constructed. It is also possible to estimate the length of time between the constructions of the various constituent parts of Mount Pleasant (Fig. SI2.e, Table SI2.b). For example, the length of time between the construction of the henge enclosure and Site IV ditch, which encompasses the duration of major

construction activity on the site is estimated to be *–15–170 years (95% probability; Fig. SI2.d)*, probably *35–125 years (68% probability)*.

It is important to note that the dating evidence only allows us to estimate when the different parts of Mount Pleasant were constructed, not the duration over which they remained in use or the date at which they were abandoned. However, the ditches of the henge have no evidence for re-cutting, nor does the palisade evidence show evidence for repair or rebuild. It is possible to estimate the minimum length of the time over which the henge enclosure ditch silted up in the area of the northern entrance to the level of Layer 6, which took place over *565–880 years (95% probability, Fig. SI2.f)*, probably *645–805 years (68% probability)*. The infant burial, cut into Layer 9 and dating to the middle Iron Age, shows that the ditches remained open for a long period (also attested at the western entrance by the bronze axe on the surface of Layer 10). A date obtained from charcoal from Layer 3 within the pit at the northern ditch terminal of the western entrance makes it possible to estimate a duration of *445–1090 years (95% probability; Fig. SI2.f)*, probably *635–9040 years (68% probability)* for the infilling of the ditch in this location.

Based on calculations that oak rots at a rate of 15 years for every 5 cm of post diameter (Wainwright 1989, 155) those palisade posts (between 30 and 50 cm in diameter, Wainwright 1979, 50) that were not burnt or removed could have stood for 90–150 years. The enormous 1.8 m diameter posts at the eastern entrance could potentially have stood for centuries. Where identified in the postholes of Ring A, the posts of Site IV were smaller at 28 cm diameter (Wainwright 1979, 23); these would therefore have remaining standing for perhaps a maximum of only 30 years, if left.

The length of time that elapsed between the digging of the Site IV ditch and Layer 5, the burning associated within sarsen fragments in the ditch, is estimated to be *80–310 years (95% probability; Fig. SI2g)*, probably *135–255 years (68% probability)*. Presuming that the Site IV ditch was contemporary or later than the settings within it, this suggests that the sarsen settings stood for a period of about a century and a half (median $\text{Difference}^4 \text{ dig_site_IV_ditch/Layer 5}$ is *190 years*) before being broken up.

Discussion

The development of Mount Pleasant

The previous chronological sequence at Mount Pleasant gave the impression of activity taking place over an extended period of the late Neolithic and early Bronze Age. This longevity led Thomas to suggest that the monument had “a significant role in the reformulation of social order” in the local area (Thomas 1996, 184). The chronology presented here vastly reduces the length of time over which the various components of the site were constructed, requiring a radical reconfiguration of

the monument's significance in late Neolithic society. The major construction activity took place in the late Neolithic over a timespan of probably *35–125 years (68% probability)*; Figure SI2.d). This period is the duration of perhaps two to five successive generations (estimated at 25 years), perhaps even with a period of living memory (Fig. 12). The grandchildren of those who helped to excavate the enormous ditches of the henge could have cut down the trees and erected the posts of the palisaded enclosure. Similarly, it may have been their children who decided to dig the ditch around Site IV.

The earliest major construction activity was the digging of the enormous henge ditch and the creation of its associated bank. The enclosure was built to separate the highest and most westerly end of the Alington ridge, overlooking a fording point of the River Frome (Fig. 1). The construction of the earthwork enclosure was a colossal undertaking which, contrary to Wainwright's initial interpretation, now appears to have been created in one relatively short episode (although the bank on the southern side may have been later heightened; Barber 2014, 27). Such a construction project would have required significant labour input and logistical support from many, suggesting perhaps that people may have been drawn from a wider area than the immediate Dorchester region.

The palisaded enclosure has now been relocated to a period of intense late Neolithic activity at Mount Pleasant, rather than in the developed early Bronze Age. The wide causeway through the henge ditch to the north has a corresponding narrow entrance (less than 1 m wide) in the circuit of the palisaded enclosure, flanked by enormous timber posts. The henge entrance to the east is also aligned with a narrow entrance in the palisade. However, the south-west and south-east henge entrances do not appear to have corresponding gaps in the palisade, and the line of the palisade adjacent to the fifth, southern, entrance (Barber 2014, 25) has not been excavated. Therefore at least two of the original henge entrances were blocked by the position of the inner palisade, a relatively short time after the henge was constructed (*15–100 years (68% probability)*). Once the palisade had been built, those entering the henge using these entrances would have had to circumnavigate the palisade to the north-east or north-west in order to access the interior of the henge. The close-set nature of the posts (Wainwright 1979, fig. 33) suggests that physical and visual access was prevented and closely controlled. The henge entrances left open were those that led north and east towards the river, emphasising the importance of arrival or departure by the river or across the ford, or the role of the river as part of rituals or ceremonies.

The remarkable oak posts flanking the eastern entrance were 1.8 m in diameter, set 2 m deep in the ground (Wainwright 1979, 63); each is estimated to have weighed a staggering 17 tonnes (Gibson 1998, 75). Many hundreds of other posts, from substantial felled trees, would have been needed for the construction of the rest of the circuit. Where were the trees for this structure, and for Site IV,

brought from? Snails from the ditches of Alington Avenue long barrow, Flagstones and Mount Pleasant indicate an open environment with intensive grazing and some cultivation from the middle to late Neolithic (Woodward 1991, 129; Healy 1997, 184; Wainwright 1979, 7). Although there was more open scrubby woodland in the vicinity of the Greyhound Yard (Davies *et al.* 2002, 192), the evidence suggests that established woodland with trees of the type needed was likely to have been located at some distance from the site. The charcoal evidence from Mount Pleasant shows the probable deliberate selection of oak trees, the most common choice of timber for late Neolithic palisaded enclosures and timber circles across Britain and Ireland (Noble 2017, 145; Millican 2016, 72). Oak may have been selected due to its size, longevity or durability, but the tree may also have had an important place within perceptions and beliefs relating to woodland and the landscape. Suitable tall and straight tree trunks may have been transported across relatively long distances over land or floated along waterways. The sheer numbers of oak trees felled for the palisaded enclosure and concentric circles at Mount Pleasant would have had a noticeable impact on the landscape, whether this was concentrated in the local area or spread over a much wider region. Although calculations can be made of the amount of mature woodland needed to procure the number of suitable oak trees (Whittle 1997, 154), in this case over 10 ha, it is not known how far the trees were transported. The felling of these trees may have been entangled with the clearance and management of woodland for other purposes (Brophy & Millican 2015, 319). Alternatively, it has been suggested that sacred trees were incorporated into these enclosures and monuments (Noble & Brophy 2011, 81); perhaps individual communities brought their own trees to contribute to the building project, an explanation suggested for stone circles with varied lithologies such as the Ring of Brodgar (Downes *et al.* 2013, 106).

In the decades around 2500 cal BC, at a similar time to when the palisaded enclosure was being constructed, the Conquer Barrow was built on top of the henge bank. Originally standing at least 7 m high, it would have provided a distinct vantage point from which it would have been possible to view activities taking place inside the henge, as has been argued for Droughduil mound, overlooking the Dunragit palisaded enclosures (Thomas 2015, 173). It is tempting to link the construction of the mound to the palisade, with the more restricted entrances and convoluted routes towards the centre perhaps requiring the construction of a viewing platform. This may also be the date that the henge bank along the south was heightened (Barber 2014, 27), again providing a possible vantage point over activities in the interior.

The sense that each post, or section of the palisaded enclosure, may have had an identity is further supported by subsequent differential treatment of the standing posts (Fig. 6). Individual posts or sectors may have retained meaning as constituent parts of this larger monument, perhaps being

associated with the geographic locations where they grew, or with individual people or groups. Posts may have been carved, painted, or decorated. As a substance, wood changes – it weathers, rots, crumbles and decays, mapping the passing of time (Fowler 2003; Thomas 2004, 183), a process that might be delayed or prolonged through charring (see below). Animals, birds and insects will inhabit rotten wood, gnaw at the bark or dig at the base of posts. Moss, lichens and fungi grow. Vertical timbers, if left, will eventually rot through at ground level and collapse quite dramatically, possibly setting off a domino effect with several posts falling at once. Among Ponca and Omaha Native American communities, timber poles could be revered as sacred mysteries, embodied ancestors and living beings. As they decay, the posts lean and therefore point; they receive offerings, are routinely attended to and are provided with their own sacred bundles (Pauketat 2012, 83). It is possible that these dramatic changes to a site were carefully interpreted by later visitors to the monument and were perhaps related back to the histories of individual posts. The falling of a post might reveal something about the past or even predict the future. An episodically decaying monument would have been an active and dynamic place, ripe for interpretation and potentially influencing human actions. Clearly those palisade posts left to rot would have served as visible and powerful reminders of the monument and the activities that took place there for several generations (Millican 2016, 74).

Like some other palisaded enclosures in southern Britain and Ireland, a substantial portion of the palisaded enclosure at Mount Pleasant was burnt, particularly its southern side, with the postholes containing large quantities of charred oak (Fig. 6). If this burning took place in one episode, it would have been a memorable event for those who witnessed it, a communal ‘flashbulb memory’ (Noble 2006, 58; Brophy *et al.* 2017, 5). Perhaps this dramatic event was prescribed from the outset, marking the end of a ritual cycle (Whittle 1997, 158) or it could represent some form of slighting or attack on the enclosure. Certainly, the destruction and removal of posts, whether by natural processes or human action, was as much a part of the dynamism of timber monuments as their initial construction (Thomas 2004; Millican 2016)

The postholes of the Mount Pleasant palisade sometimes contained burnt posts as charcoal lumps, and occasionally, this charcoal extended to the base of the original posts (Wainwright 1979, 54). In two instances (in Cuttings XII and XVI) burnt chalk was recorded, suggesting that these posts burnt *in situ* at high temperatures (Wainwright 1979, 59, 60). However, it cannot be assumed that burning only occurred at a time of destruction (Brophy & Millican 2015, 311). Although there is some doubt as to its effectiveness, post-base charring may have been undertaken to prolong the life of standing timbers, as suggested for the Hindwell II enclosure (Gibson 1998, 69). The charring would have to extend to the ground surface where posts will rot first (Speak & Burgess 1999, 19). An

alternative explanation is that the entire lengths of some posts were deliberately charred before being erected as part of the enclosure. The appearance of charred black posts standing against the white chalk of the palisade trench upcast and still largely open henge ditches would have been particularly striking (Fig. 13).

[Figure 13]

The last dated major construction activity at Mount Pleasant was the digging of the ditch surrounding the concentric timber and stone monument at Site IV (*50% probable*; Table SI2a). It must be remembered that the concentric monument itself has not been dated and may pre-date the enclosing ditch. As Gibson (1998, 36) has noted, where timber circles and henges are found together, the timber structure was usually constructed before the enclosing bank and ditch. We suggest that the timber elements of Site IV were erected at a similar time to the palisaded enclosure, with the surrounding ditch dug later. This ‘henging’ (Warner 2000) or ‘wrapping’ (Richards 2013) of the site may derive from a strategy of containment for the timber structure, the deposits made within or the activities that took place there.

Site IV was constructed on the highest point of the ridge (Fig. 2), probably deliberately sited to provide the most impressive view to those approaching from lower ground. The timber structure has four ‘avenues’ or pathways which lead towards the centre of the site, a pattern also seen at the Sanctuary, Wiltshire (Pollard 1992) and within the largest circle at Stanton Drew (Linford *et al.* 2017, 4). Although these four approaches may indicate the way that individuals moved into the centre of the circles, this is not borne out by analysis of patterns of deposition of Grooved Ware and other objects at the site. Instead, these indicate circular movements, with people moving between the rings of posts and depositing objects in appropriate arcs (Thomas 1996, 198–202). However, detailed analysis of the deposition of material culture within Site IV is not possible as the postholes were severely truncated. Thomas (1996, 202) has drawn attention to the fact that the Grooved Ware deposited in the Site IV ditch had a different character to that deposited within the henge ditch, where significant concentrations were placed in the northern entrance terminals. Whereas the Grooved Ware pottery from the primary layers of the henge ditch was dominated by pots with applied cordons, the assemblage from Site IV displays incised diagonals and herringbone motifs, or complex panels of decoration. This difference was interpreted by Thomas as alternate types of pots being appropriate for use and deposition in parts of the site. However, it can now be seen that these two components of the site are probably *35–125 years* apart (*68% probability*; Fig. S12.d); the change in decoration may, at least partly, reflect the development of this pottery style over time.

It has been argued that the addition of standing sarsens at the perimeter and centre of Site IV helped to clarify patterns of movement, by blocking access to the entrance of each pathway (Thomas 1996,

198). However, there is no clear indication of a stratigraphic sequence between the timber and stone elements, and it is quite possible that the two material types stood together concurrently, or that the succession from stone to timber occurred in a short time-frame. This is supported by four pits at the centre of the site, linked by stoneholes to form a square (Wainwright 1979, 28). These shallow pits may have held upright posts or stones, and would therefore bring Site IV into line with other 'square-in-circle' monuments in Britain and Ireland. Rather than being necessarily late in the sequence, this square arrangement at the centre may instead have been integral to the concentric structure.

Only two postpipes were found within the postholes of Site IV during excavation (Wainwright 1979, 26), although as the features of this structure were severely truncated, it is not possible to tell if the posts were removed or rotted *in situ*. Around one or two centuries after the ditch around Site IV had been dug (Fig. 9), it had silted up considerably and within it a layer of sarsen chips and burning, with Beaker pottery, was deposited. This is most likely related to sarsen stone breaking and destruction than to their initial erection, particularly as several sarsen mauls were found at this level and above (Wainwright 1979, 163). By this stage the timbers of Site IV are likely to have also been removed or to have rotted *in situ*. Note that this sarsen breaking is unlikely to have occurred at the same time as the destruction of the timber palisade, as the date estimate for the layer in the Site IV ditch does not overlap with the single radiocarbon date (BM-665) which provides a *TPQ* for the burning of the palisade.

Continued activity at Mount Pleasant in the Chalcolithic is attested by the continued deposition of varied styles of Beaker pottery in the top of the palisade trench, in the Site IV ditch and in the henge ditch, while sherds of Collared Urn, Bucket Urn and Food Vessels dominate above Layer 8 of the henge ditch fill (Thomas 1996, 218). An early Bronze Age decorated flat bronze axe was placed in the northern terminal of the henge ditch at the western entrance (Wainwright 1979, 40). At this date, it is possible that some of the posts of the palisaded enclosure were still standing. The wide henge ditches remained as distinct earthworks, up to 2 m deep into the Iron Age, when at least one and probably more children were buried in the ditch. This may be associated with contemporary activity represented by stakeholes within the ditch and an Iron Age roundhouse with associated pits and gullies built on the location of Site IV (Wainwright 1979, 31–4).

Henge enclosures

There are long-recognised parallels between the size, layout and form of Mount Pleasant henge and other large henge enclosures in southern England, particularly those of Avebury, Marden, Durrington Walls, and the Southern Henge at Knowlton (Wainwright 1989). However, the elevated ridge-top position of Mount Pleasant is different to these other examples, which enclose dry valleys

or are located on lower lying ground. In fact, the position of Greyhound Yard to the west is more closely comparable to these other henge enclosures, particularly with Durrington Walls. Recent excavations and scientific analyses have underlined the parallels between henge enclosures in southern England. There is evidence for large-scale feasting of meat from animals raised on a variety of geologies at Marden, Durrington Walls and Mount Pleasant, suggesting movement over distances of at least 50 km in the latter, and considerably more at the other sites (Madgwick *et al.* 2019). Comparable chalk and stake-built buildings have been found at Marden and Durrington Walls (Leary & Field 2012; Parker Pearson 2012). The henge bank at Durrington Walls is estimated to have been constructed in early twenty-fifth century cal BC (Parker Pearson *et al.* 2013, 171). A single date exists on unknown material from the enclosure at Knowlton (2570–2190 cal BC 2σ ; Beta-141096, 3890±60 BP; Gale 2017, 106) and the henge enclosure at Marden also dates to the mid-3rd millennium cal BC (Worley forthcoming). Although a chronological model of scientific dates has been published for Avebury (Healy 2016), the samples were obtained in a piecemeal fashion over several years. This provides a provisional estimate of the construction of the henge earthwork in 2580–2470 cal BC (95% probability; Healy 2016, fig. 9: *dig_Avebury_ditch*), probably 2530–2485 cal BC (68% probability). The archive from Avebury contains potential samples that could be used in a programme of dating to refine this chronology. Mount Pleasant therefore fits into an emerging picture that these large henge enclosures in southern England date from the centuries around 2500 cal BC.

Palisaded enclosures

[Figure 14]

The estimate for the construction of the Mount Pleasant palisaded enclosure, 2530–2465 cal BC (68% probability, see above) places it firmly within the currency of large timber palisades constructed across Britain and Ireland in the late Neolithic, for which radiocarbon dates are available from a total 12 sites (Figs. 14 and 15; SI4). The form, nature and type of cultural deposition (carved chalk, animal bones, Grooved Ware pottery) at the site and the varied treatment of the posts by burning, removal or decay, all find ready parallels within this late Neolithic group (Gibson 1998; 2002; Noble & Brophy 2011). Those palisaded enclosures that are well-dated (Mount Pleasant, Hindwell, Greyhound Yard and Forteviot) now tightly cluster in the centuries around 2500 cal BC.⁵ These date estimates do not support previous suggestions that enclosures with continuous ditches developed out of earlier enclosures with well-spaced individual posts (Whittle 1997, 161; Gibson 1998, 71). The double palisaded enclosure at Marne Barracks, Catterick, does however appear to be an outlier, suggested by its slightly later date, its unusual layout (wide entrances and radially aligned posts) and geographic isolation (Hale *et al.* 2009; Fig. 15). The

estimated date for the palisaded enclosures at West Kennet currently fall in the middle Neolithic (Bayliss *et al.* 2017); discrepancies in the dating of this site will hopefully be resolved through new analysis of material from recent excavations.

[Figure 15]

The form of the Mount Pleasant palisade, with close-set posts set in a continuous ditch, is unusual in this wider group, but paralleled most closely at West Kennet. Most other examples of timber enclosures with uprights set in continuous bedding trenches date to the early Neolithic. These are more appropriately termed ‘fenced sites’; smaller in size and with smaller posts (Gibson 1998, 73). Those at Orsett, Essex, Haddenham, Cambridgeshire and Donegore, Co. Antrim are associated with ditched causewayed enclosures (Oswald *et al.* 2001, 52; Mallory *et al.* 2011) whereas examples at Knowth, Co. Meath, Lyles Hill, Co. Antrim, Thornhill, Co. Derry and Tullahedy, Co. Tipperary enclose or are associated with settlements (Eogan & Roche 1997, 44–8; Sheridan 2001, 178; Logue 2003; Cleary & Kelleher 2011).

The relationship between the pair of palisaded enclosures at Mount Pleasant and Greyhound Yard positioned along the same river, is paralleled by the enclosures of Forteviot and Leadketty located only 4 km apart on the River Earn (Brophy & Noble 2012; Brophy & Noble forthcoming). Each of these pairs has contrasting patterns of deposition and different styles of timber construction. Clusters of palisaded enclosures are also known; four enclosures were built in close proximity in the Walton Basin (including the Hindwell double palisaded enclosure, Jones & Gibson 2017) and two at West Kennet (Whittle 1997). The number of circuits ranges from one to a maximum of three (in the case of Dunragit), and the patterning of posts varies, Leadketty had small and large alternate posts (Noble & Brophy 2014, 70), Meldon Bridge had pairs of smaller posts separated by single larger posts (Speak & Burgess 1999, 15) and the enclosures at Marne Barracks had paired posts set in radially aligned slots (Hale *et al.* 2009, 268). At Blackhouse Burn a low stony bank was constructed between the two circuits of posts (Lelong & Pollard 1998, 43). Other possible examples, as yet unexcavated, include a curving alignment of pits at Kinloch in Fife (Noble & Brophy 2011, 64) and an extraordinary triple palisaded enclosure around Newgrange in Co. Meath (Condit & Keegan 2018).

Gibson’s typology, dividing palisaded enclosures into four types based on the spacing of the posts (Gibson 2002; Jones & Gibson 2017), seems overly complex for such a small number of monuments and ignores other key characteristics of these sites, such as their topographic position or the types of activity that they enclose. The recent discovery of a palisaded enclosure beneath the henge bank at Durrington Walls (Parker Pearson *et al.* 2017) raises the possibility that several earthwork ‘henge enclosures’ in southern Britain may have had earlier timber iterations, showing

that some earthen enclosures had similar biographies and patterns of use to timber enclosures. This was not a chronological relationship; although the timber enclosure at Durrington Walls was replaced by an earthwork henge, the opposite sequence is evident at Mount Pleasant, with the palisaded enclosure built after the henge enclosure (*92.4% probable*; Table SI2a). Alternatively, the presence of large pits within the southern entrance causeway of the henge may indicate that another palisade stood on the site prior to the earthen henge (Barber 2014, 25–6), thereby implying a rebuilding or repositioning of the timber enclosure during the history of the site. Further dating programmes on samples which relate directly to the construction of other palisaded enclosures will provide more precise estimates for their currency and may elucidate any regional trends in the development and spread of this monument type.

Round mounds

[Figure 16]

Although no further samples relating to the Conquer Barrow were available for dating, it is possible to reassess the available estimate (*BM-795*) considering other recent work on late Neolithic round mounds. On the basis of the available evidence, the construction of the Conquer Barrow and the palisaded enclosure are broadly contemporary (Table SI2a), although it should be remembered that there are 16 likelihoods from the palisaded enclosure, and only one from the Conquer Barrow ditch. Comparison shows that the Conquer Barrow may be one of the earliest large round mounds in southern England, being perhaps contemporary with the Marlborough Mound and earlier than both the Hatfield Barrow and Silbury Hill (Fig. 16). There is a clear association between these well-dated round mounds and nearby large timber or earth enclosures (Fig. 15), with the exception of Marlborough Mound; perhaps a palisaded enclosure or henge enclosure lies underneath the nearby town (Leary *et al.* 2013, 58). A complementary role for enclosures and large mounds has been suggested by Thomas in his discussion of the palisaded enclosure at Dunragit, where the avenue-like entrance aligns on nearby Droughduil Mote (Thomas 2015, 172–4). Something similar is seen at Knowlton, where the ‘Great Barrow’ is located close to the central and southern henges, and at Marne Barracks with the likely Neolithic mound at Castle Hills (Hale *et al.* 2009, 267). A similar relationship exists at Arbor Low in the Peak District, where a barrow is superimposed onto the henge enclosure in a similar way to Mount Pleasant. It also overlooks a concentric circular structure with a central cove or square stone arrangement, although that remains undated (Barnatt 1990, 33). If the Conquer Barrow was built as a viewing platform, as suggested above, then perhaps one of the purposes of these mounds, at least in their final stage, was to elevate certain people above others, providing commanding views over nearby enclosures as spaces for performance (Barrett 1994, 31; Whittle 1997, 151; Thomas 2015, 173). People standing on these platforms may have been elevated

both physically and socially, or alternatively may have been excluded from entering the nearby enclosures, suggesting some form of social differentiation. Alternatively, the Conquer Barrow may have been built as a prominent marker, standing white in the landscape, emphasising the location of Mount Pleasant within the region to those approaching the site or living in the locality.

Concentric timber circles

[Figure 17]

Site IV is part of a group of late Neolithic timber monuments, representing a continuum of architectural tradition that ranges from simple four-post structures (often called ‘square-in-circle’ monuments) to elaborate and varied concentric circles (Fig. 17; Pollard 2009, 2012, Noble *et al.* 2011, Darvill 2016). Generally associated with mid-3rd millennium cal BC depositional practices and material culture, including Grooved Ware pottery, these structures are often found in association with larger henge or palisaded enclosures and are generally regarded as a form of monumentalised house in the form of a shrine or temple (Pollard 2009, 344).

Although radiocarbon dates are available from 16 simple four-post structures across Britain and Ireland very few of these samples can be used to estimate their time of construction with any reliability, as the dates were obtained from bulked, unidentified samples, material with potentially large-at-death offsets or on material not directly related to the structures (Table SI5). The dating of more elaborate concentric timber monuments is equally unclear, with only the concentric timber monument of ‘woodhenge’ at Catholme in Staffordshire having a robust estimate for its construction at 2570–2470 cal BC (95% probability; Chapman *et al.* 2010, fig. 13:

*LastWoodhenge*⁶), probably 2550–2480 cal BC (68% probability). These date estimates suggest that Catholme ‘woodhenge’ is earlier than the digging of Site IV ditch. Only more precise dating of both elaborate timber circles and ‘square-in-circle’ monuments may help us tease out individual site sequences and examine the relationship between these different types of timber structure more closely.

Small samples; big questions

[Figure 18]

[Figure 19]

The shorter chronology for constructional activity at Mount Pleasant suggests that the monument was never viewed as a static, unchangeable entity, but instead was a dynamic place that could be changed and altered during dramatic episodes of construction, use, and later destruction or dismantling (Figs. 18 and 19). The chronology still supports Thomas’s (1996, 212) interpretation that the additions to the monument had the effect of restricting movement in space and visibility

across the site over time, or alternatively an increasing strategy of containment and restriction of powerful forces at the centre of the complex. These changes can now be seen in the context of successive generations, rather than the long expanse of time previously envisaged. The initial monumental effort of constructing the enormous and highly visible enclosing bank and ditch created an arena within which more closely defined and less durable components were built, which are likely to have taken less effort and perhaps smaller numbers of people to create.

Mount Pleasant is best viewed as one of a number of closely related large enclosures built of timber or earth. Although the material chosen to create a bounded arena was clearly significant, with implications for the temporality and potential of the enclosure in the future, we have perhaps over-emphasised the difference between enclosures built of different materials, dividing them into the separate monument types of palisaded enclosures and henge enclosures. Despite their wide geographic spread (Figure 16), both types of enclosure exhibit remarkable similarities in overall plan, associated depositional practices and the types of structures and activities contained within. These similarities imply some degree of contact or movement of people between far-flung parts of Britain and Ireland in the late Neolithic, with the sharing of ideas relating to monument construction and ritual deposition, likely to be closely related to similar worldviews and religious beliefs. It should be stressed that this does not suggest any form of ‘pan-British’ connectivity (*contra* Madgwick *et al.* 2019, 9) as there are large parts of Britain and Ireland where these forms of ceremonial enclosures are absent. However, there were clearly overlapping spheres of influence and networks along which ideas, people and objects could flow with some considerable rapidity.

New date estimates for the burning and sarsen layer within the ditch of Site IV, interpreted here as a destruction episode, show that this Beaker-associated activity took place 5–220 years (95% probability), probably 45–160 years (68% probability) after the first appearance of Beaker pots in burials in England (Fig. 19). Studies of ancient DNA and, to a certain extent, stable isotopes indicate an influx of new arrivals at this time, travelling from a variety of European locations to Britain and Ireland (Olalde *et al.* 2019; Parker Pearson *et al.* 2019). The evidence from Site IV raises interesting questions about the relationship between those people involved in frenetic and labour-intensive monument construction, and the arrival of Beaker-using people. The principal assemblage of Beaker pottery was found in Layer 5 of the western ditch terminal, Segment XIII, estimated to have been deposited in 2360–2200 cal BC (95% probability; Fig 9, *seg_XIII_layer_5*), probably 2335–2280 cal BC (45% probability) or 2250–2205 cal BC (23% probability). This included several All-Over-Comb (AOC) vessels (Longworth 1979, P134, 137–140, and 143–145), sherds from three Maritime vessels (P164, 178–9) as well as a single sherd from a Cord-Zoned-Maritime (CZM) Beaker (P177). Woodward (2002, 1043) has drawn attention to the mix of early

and later Beakers from this context, suggesting that the earlier pots had been curated or had circulated for some time prior to deposition in the ditch. Much of this material has direct parallels with mainland Europe, perhaps reflecting the location of Mount Pleasant on a river network that leads to Poole Harbour and close to the south coast, a position within emerging cross-channel networks. The association of AOC and CZM or AOC/Maritime Beaker pots is found in two early graves in Wessex, those belonging to the Amesbury Archer and that of the Boscombe Bowmen (Fitzpatrick 2012). Collectively these two grave deposits and the assemblage from Site IV are representative of the beginning of the Beaker period as visible in the archaeological record (Fitzpatrick 2011), and the estimate for the deposition of Layer 5 provides a chronological framework for this horizon that can be compared directly with the funerary evidence. There are also comparable early date estimates (Parker Pearson *et al.* 2019, table 2.4) from two Beaker-accompanied burials at Thomas Hardy School, 2.8 km to the west, one of whom has bone stable isotope results which suggest long-distance movement, perhaps from the French chalk (Gardiner *et al.* 2007, 38; Parker Pearson *et al.* 2019, 337–8). The destruction of the sarsen stones at Site IV, a physical eradication of an important megalithic structure in the deepest and most sacred space of the monument, is therefore likely to be associated with the earliest activities of Beaker-using people in Wessex. Here we might be witnessing the impact of new religious and ideological concepts antithetical to those represented by earthwork, timber and stone monuments.

There is a growing sense in which the centuries around and after 2500 cal BC were pivotal years of change, a major tipping point (Robb & Pauketat 2013) when rapid transitions took place. The chronology for the use of Beaker pots in burials is now precisely defined (Jay *et al.* 2019) but crucial to understanding the period is the creation of comparable detailed narratives for late Neolithic activity at monument complexes. Only with further precise dating of late Neolithic monument construction and associated activities, and how these relate to the arrival of new people and ideas from the Continent, can we attempt to write a fuller history of this dramatic period.

As a final note, it is important to note that this dating programme was only possible due to the high quality of the original excavations and their diligent recording, and the long-term storage of the post-excavation archive in Dorset County Museum. With improving scientific techniques such as ancient DNA, isotope studies, ceramic residue analysis and radiocarbon dating, the value of these museum collections and the importance of their long-term preservation cannot be underestimated.

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References

- Barber, M. 2014. *Mount Pleasant, Dorset: A Survey of the Neolithic 'Henge Enclosure' and Associated Features*. Portsmouth: English Heritage Research Report Series 70-2014
- Barber, M., Winton, H., Stoertz, C., Carpenter, E. & Martin, L. 2010. The brood of Silbury? A remote look at some other sizeable Wessex mounds. In J. Leary & D. Field (eds), *Round Mounds and Monumentality in the British Neolithic and Beyond*, 153–73. Oxford: Oxbow, Neolithic Studies Group Seminar Papers
- Barnatt, J. 1990. *The Henges, Stone Circles and Ringcairns of the Peak District*. Sheffield: University of Sheffield
- Barrett, J. 1994. *Fragments from antiquity. An archaeology of social life in Britain, 2900–1200 BC*. Oxford: Basil Blackwell
- Bayliss, A., Cartwright, C., Cook, G., Griffiths, S., Madgwick, R., Marshall, P. & Reimer, P. 2017. Rings of fire and Grooved Ware settlement at West Kennet, Wiltshire. In P. Bickle, V. Cummings, D. Hofmann & J. Pollard (eds) *The Neolithic of Europe: Papers in Honour of Alasdair Whittle*, 249–77. Oxford: Oxbow
- Bowman, S. 1990. *Interpreting the Past: Radiocarbon Dating*. London: British Museum Press
- Bowman, S.G.E., Ambers, J.C., & Leese, M.N. 1990. Re-evaluation of British Museum radiocarbon dates issued between 1980 and 1984. *Radiocarbon* 32(1), 59–79
- Bradley, R. 1975. Maumbury Rings, Dorchester: the excavations of 1908–13. *Archaeologia* 105, 1–97
- Bradley, R. 1988. Revised radiocarbon dates for Wor Barrow and Maumbury Rings. *Proceedings of the Dorset Natural History and Archaeological Society* 110, 160
- Bronk Ramsey, C. 1995. Radiocarbon calibration and analysis of stratigraphy the OxCal program. *Radiocarbon* 37(2), 425–30
- Bronk Ramsey, C. 2009. Bayesian analysis of radiocarbon dates. *Radiocarbon* 51(1), 337–60
- Bronk Ramsey, C. 2017. Methods for summarizing radiocarbon datasets. *Radiocarbon* 59(6), 1809–33
- Brophy, K. & Millican, K. 2015. Wood and fire: Scotland's timber cursus monuments. *Archaeological Journal* 172 (2), 297–324
- Brophy, K. & Noble, G. 2012. Henging, mounding and blocking: the Forteviot henge group. In A. Gibson (ed.) *Enclosing the Neolithic: Recent Studies in Britain and Europe*, 21–35. Oxford: Archaeopress, BAR Int. Series 2440
- Brophy, K. & Noble, G. forthcoming. *Prehistoric Forteviot: Excavations of a Ceremonial Complex in Eastern Scotland*. York: Council for British Archaeology.
- Brophy, K., Goecheritz, C. & Macgregor, G. 2017. Build N Burn: Using fire as a tool to evoke, educate and entertain. *Archaeological Journal* 174, 437–63
- Brown, T.A., Nelson, D.E., Vogel, J.S. & Southon, J.R. 1988. Improved collagen extraction by modified Longin method. *Radiocarbon* 30(2), 171–7
- Buck, C.E., Litton, C.D., & Smith, A.F.M. 1992. Calibration of radiocarbon results pertaining to related archaeological events. *Journal of Archaeological Science* 19(5), 497–512
- Buck, C.E., Cavanagh, W.G., & Litton, C.D. 1996. *Bayesian Approach to Interpreting Archaeological Data*. Chichester: Wiley
- Burleigh, R., Longworth, I.H., & Wainwright, G.J. 1972. Relative and absolute dating of four late Neolithic enclosures: an exercise in the interpretation of radiocarbon determinations. *Proceedings of the Prehistoric Society* 38, 389–407
- Chapman, H.P., Hewson, M. & Watters, M.S. 2010. The Catholme ceremonial complex, Staffordshire, UK. *Proceedings of the Prehistoric Society* 76, 135–63
- Cleary, R.M. & Kelleher, H. 2011. *Archaeological Excavations at Tullahedy, County Tipperary: Neolithic Settlement in North Munster*. Cork: Collins Press

- Condit, T. & Keegan, M. 2018. *Aerial Investigation and Mapping of the Newgrange Landscape, Brú na Bóinne, Co. Meath*. Interim report, Department of Culture, Heritage and the Gaeltacht.
- Darvill, T. 2016. Houses of the holy: architecture and meaning in the structure of Stonehenge, Wiltshire, UK. *Time and Mind* 9(2), 89–121
- Davies, S.M., Bellamy, P.S., Heaton, M.J. & Woodward, P.J. 2002. *Excavations at Alington Avenue, Fordington, Dorchester, Dorset, 1984–87*. Dorchester: Dorset Natural History and Archaeological Society
- Davies, S. & Farwell, D. 1989. Charles Street, Dorchester, Wessex Court Development. *Proceedings of the Dorset Natural History and Archaeology Society* 111, 107–9
- Dresser, Q. 1985. University College Cardiff radiocarbon dates I. *Radiocarbon* 27(2B), 338–85
- Downes, J., Richards, C., Brown, J., Cresswell, J.A., Ellen, R., Davies, A.D., Hall, A., McCulloch, R., Sanderson, D.C.W. & Simpson, I.A. 2013. Investigating the great Ring of Brodgar, Orkney. In C. Richards (ed.) *Building the Great Stone Circles of the North*, 90–118. Oxford: Oxbow
- Eogan, G. & Roche, H. 1997. *Excavations at Knowth Volume 2: settlement and ritual sites of the 4th millennium BC*. Dublin: Royal Irish Academy
- Fitzpatrick, A. 2011. The arrival of the Beaker set in Britain and Ireland. In Cunliffe, B. & Koch, J. T. (eds) *Celtic from the West 2: Rethinking the Bronze Age and the Arrival of Indo-European in Atlantic Europe*, 41–70. Oxford: Oxbow Books
- Fitzpatrick, A. 2012. *The Amesbury Archer and the Boscombe Bowmen: Bell Beaker burials at Boscombe Down, Amesbury, Wiltshire*. Salisbury: Wessex Archaeology Report 27
- Fowler, C. 2003. Rates of (ex)change: decay and growth, memory and the transformation of the dead in early Neolithic southern Britain. In H. Williams (ed.) *Archaeologies of Remembrance: Death and Memory in Past Societies*, 45–63. New York: Springer
- Gale, J. 2017. Knowlton Circles: a later Neolithic and early Bronze Age ceremonial complex and its environs – a review. *Landscapes* 18(2), 102–19
- Gardiner, J., Harding, P., Lawson, A. J., Loader, E., McKinley, J.I., Sheridan, A., Stevens, C. J., Allen, M.J. & Powell, A.B. 2007. A matter of life and death: late Neolithic, Beaker and early Bronze Age settlement and cemeteries at Thomas Hardy School, Dorchester. *Proceedings of the Dorset Natural History and Archaeological Society* 128, 17–52
- Gibson, A. 1998. Hindwell and the Neolithic palisades of Britain and Ireland. In A. Gibson & D. Simpson (ed.), *Prehistoric Ritual and Religion: Essays in Honour of Aubrey Burl*, 68–79. Stroud: Sutton Publishing
- Gibson, A. 2002. The palisaded enclosures of Britain. In A. Gibson (ed.), *Behind Wooden Walls. The Neolithic Palisaded Enclosures of Europe*, 5–23. Oxford: British Archaeological Reports International Series
- Haggarty, A. 1991. Machrie Moor, Arran: recent excavations at two stone circles. *Proceedings of the Society of Antiquaries of Scotland* 121, 51–94
- Hale, D., Platell, A., & Millard, A. 2009. A late Neolithic palisaded enclosure at Marne Barracks, Catterick, North Yorkshire. *Proceedings of the Prehistoric Society* 75, 265–304
- Harding, J. 2003. *Henge Monuments of the British Isles*. Stroud: Tempus
- Harris, O. J. T. & Sørensen, T. F. 2010. Rethinking emotion and material culture. *Archaeological Dialogues* 17(2): 145–163
- Healy, F. 1997. Site 3: Flagstones. In R.J.C. Smith, F. Healy, M.J. Allen, E.L. Morris, I. Barnes, & P.J. Woodward (eds) *Excavations Along the Route of the Dorchester By-pass, Dorset, 1986–8*. Salisbury: Trust for Wessex Archaeology
- Healy, F. 2016. Scientific dating. In M. Leivers & A.B. Powell (eds) *A Research Framework for the Stonehenge, Avebury and Associated Sites World Heritage Site: Avebury Resource Assessment*, 40–57. Salisbury: Wessex Archaeology
- Hillam, J., Morgan, R.A. & Tyers, I. 1987. Sapwood estimates and the dating of short ring sequences. In R.G.W. Ward (ed.), *Applications of Tree-Ring Studies: Current Research in Dendrochronology and Related Areas*, 165–85. Oxford: British Archaeological Reports International Series 333
- Jay, M., Richards, M.P. & Marshall, P. 2019. Radiocarbon dates and their Bayesian modelling. In M. Parker Pearson, A. Sheridan, M. Jay, A. Chamberlain, M. P. Richards & Evans, J. (eds) *The Beaker People Project: Isotopes, Mobility and Diet in Prehistoric Britain*, 43–80. Oxford: Oxbow, Prehistoric Society Research Paper 7
- Jones, N.W. & Gibson, A. 2017. Neolithic palisaded enclosures of Radnorshire's Walton Basin. *Archaeologia Cambrensis* 166, 33–88

- Law, I.A. & Hedges, R.E.M. 1989. A semi-automated bone pretreatment system and the pretreatment of older and contaminated samples. *Radiocarbon* 31(3), 247–53
- Leary, J., Canti, M., Field, D., Fowler, P., Marshall, P. & Campbell, G. 2013. The Marlborough Mound, Wiltshire: a further Neolithic monumental mound by the River Kennet. *Proceedings of the Prehistoric Society* 79, 137–63
- Leary, J. & Field, D. 2012. Journeys and juxtapositions. Marden Henge and the view from the Vale. In Gibson, A. (ed.), *Enclosing the Neolithic: Recent studies in Britain and Europe.*, 55–65. Oxford: Archaeopress, BAR Int Ser 2440
- Leary, J. & Marshall, P. 2012. The giants of Wessex: the chronology of the three largest mounds in Wiltshire. *Antiquity* 86 (334), <http://www.antiquity.ac.uk/projgall/leary334/>
- Lelong, O. & Pollard, T. 1998. The excavation and survey of prehistoric enclosures at Blackhouse Burn, Lanarkshire. *Proceedings of the Society of Antiquaries of Scotland* 128, 13–53
- Linford, N., Linford, P., Payne, A. & Greaney, S. 2017. *Stanton Drew Stone Circles and Avenues, Bath and North East Somerset: Report on Geophysical Surveys, July 2017*. Swindon: Historic England Research Report Series 79-2017
- Linford, N., Linford, P. & Payne, A. 2019. *Mount Pleasant, West Stafford, Dorset: Report on Geophysical Surveys, March and August 2019*. Swindon: Historic England Research Report Series 92-2019
- Logue, P. 2003. Excavations at Thornhill, Co. Londonderry. In I. Armit, E. Murphy, E. Nelis & D. Simpson (eds), *Neolithic Settlement in Ireland and Western Britain*. Oxford: Oxbow, 149–155
- Longin, R. 1971. New method of collagen extraction for radiocarbon dating. *Nature* 230(5291), 241
- Longworth, I.H. 1979. The Neolithic and Bronze Age pottery. In G.J. Wainwright (ed.) *Mount Pleasant, Dorset: Excavations 1970-1 Incorporating an Account of Excavations Undertaken at Woodhenge in 1970*. London: Report of Research Committee of the Society of Antiquaries of London 37, 75–124
- Madgwick, R., Lamb, A.L., Sloane, H., Nederbragt, A.J., Albarella, U., Parker Pearson, M. & Evans, J.A. 2019. Multi-isotope analysis reveals that feasts in the Stonehenge environs and across Wessex drew people and animals from throughout Britain. *Science Advances* 5(3), eaau6078
- Mallory, J.P., Nelis, E. & Hartwell, B. 2011. *Excavations on Donegore Hill, Co. Antrim*. Bray: Wordwell
- Marshall, P., Bayliss, A., Leary, J., Campbell, G., Worley, F., Bronk Ramsey, C. & Cook, G. 2013. The Silbury chronology. In J. Leary, D. Field & G. Campbell (eds) *Silbury Hill: The Largest Prehistoric Mound in Europe*, 97–116. Swindon: English Heritage: Swindon
- Millican, K. 2016. *The Timber Monuments of Neolithic Scotland*. Archaeopress: Oxford, BAR British Series 623
- Needham, S. 2006. From henge to barrow: Ringlemere M1 and comparable monuments. In S. Needham, K. Parfitt & G. Varndell (eds) *The Ringlemere Cup: Precious Cups and the Beginning of the Channel Bronze Age*. London: British Museum Research Publication 163, 16–30
- Noble, G. 2017. *Woodland in the Neolithic of Northern Europe: The Forest as Ancestor*. Cambridge: Cambridge University Press
- Noble, G. & Brophy, K. 2011. Ritual and remembrance at a prehistoric ceremonial complex in central Scotland: excavations at Forteviot, Perth and Kinross. *Antiquity* 85(329), 787–804
- Noble, G. & Brophy, K. 2014. Construction, process, environment: altering the landscape in Neolithic lowland Scotland. In H. v. Furholt, M. Hinz, D. Mischka, G. Noble and D. Olausson (eds) *Landscapes, Histories and Societies in the Northern European Neolithic*, 65–77. Kiel: Frühe Monumentalität u. Soziale Differenzierung
- Noble, G. & Brophy, K. 2017. Cremation practices and the creation of monument complexes: the Neolithic cremation cemetery at Forteviot, Strathern, Perth and Kinross, Scotland, and its comparanda. *Proceedings of the Prehistoric Society* 83, 213–45
- Noble, G., Greig, M. & Millican, K. 2011. Excavations at a multi-period site at Greenbogs, Aberdeenshire, Scotland and the four-post timber architecture tradition of late Neolithic Britain and Ireland. *Proceedings of the Prehistoric Society* 78, 135–71
- Otlet, R.L., Walker, A.J., Hewson, A.D. & Burleigh, R. 1980. ¹⁴C interlaboratory comparison in the UK: experiment design, preparation and preliminary results. *Radiocarbon* 22(3), 936–46
- Olalde, I., Brace, S., Morten E. Allentoft, M.E., Ian Armit, I., Kristiansen, K., Rohland, N., Mallick, S., Booth, T., Szécsényi-Nagy, A., Mittnik, A., Altena, E., Lipson, M., Lazaridis, I., Patterson, N., Broomandkoshobacht, N., Diekmann, Y., Faltyskova, Z., Fernandes, D., Ferry, M., Harney, E., de Knijff, P., Michel, M., Oppenheimer, J., Stewardson, K., Barclay, A., Alt, K.W., Avilés Fernández, A., Eszter Bánffy, E., Bernabò-Brea, M., Billoin, D., Blasco, C., Bonsall, C., Bonsall, L., Allen, T., Büster, L., Carver, S., Castells Navarro, L., Craig, O.E., Cook, G.T., Cunliffe, B., Denaire, A.,

- Egging Dinwiddy, K., Dodwell, N., Ernée, M., Evans, C., Kuchařík, M., Farré, J.F., Fokkens, H., Fowler, C., Gazenbeek, M., Garrido Pena, R., Haber-Uriarte, M., Haduch, E., Hey, G., Jowett, N., Knowles, T., Massy, K., Pfrengle, S., Lefranc, P., Lemerrier, O., Lefebvre, A., Maurandi, J.L., Majó, T., McKinley, J.I., McSweeney, K., Balázs Gusztáv, M., Modi, A., Kulcsár, G., Kiss, V., Czene, A., Patay, R., Endrődi, A., Köhler, K., Hajdu, T., Cardoso, J.L., Liesau, C., Parker Pearson, M., Włodarczak, P., Price, T.D., Prieto, P., Rey, P.-J., Ríos, P., Risch, R., Rojo Guerra, M.A., Schmitt, A., Serralongue, J., Silva, A.M., Smrčka, V., Vergnaud, L., Zilhão, J., Caramelli, D., Higham, T., Heyd, V., Sheridan, A., Sjögren, K.-G., Thomas, M.G., Stockhammer, P.W., Pinhasi, R., Krause, J., Haak, W., Barnes, I., Lalueza-Fox, C. & Reich, D. 2019. The Beaker phenomenon and the genomic transformation of northwest Europe. *Nature* 555, 190–6
- Oswald, A., Dyer, C. & Barber, M. 2001. *The Creation of Monuments. Neolithic Causewayed Enclosures in the British Isles*. Swindon: English Heritage
- Parker Pearson, M. 2012. *Stonehenge: Exploring the Greatest Stone Age Mystery*. London: Simon & Schuster
- Parker Pearson, M., Pollard, J., Richards, C., Thomas, J., Tilley, C. & Welham, K. 2008. The Stonehenge Riverside Project: exploring the Neolithic landscape of Stonehenge. *Documenta Praehistorica* 35, 153–66
- Parker Pearson, M., Marshall, P., Pollard, J., Richards, C., Thomas, J. & Welham, K. 2013. Stonehenge. In H. Fokkens & J. Harding (eds) *The Oxford Handbook of the European Bronze Age*, 159–78. Oxford: Oxford University Press
- Parker Pearson, M., Chan, B., Chapman, H., Gaffney, V., Garwood, P., Marshall, P., Aldrian, L. & Neubauer, W. 2017. Durrington Walls: was this the start of Britain's Copper Age? *PAST: Newsletter of the Prehistoric Society* 87, 3–5
- Parker Pearson, M., Sheridan, A., Jay, M., Chamberlain, A., Richards, M.P. & Evans, J. (eds) 2019. *The Beaker People Project: Isotopes, Mobility and Diet in Prehistoric Britain*. Oxford: Oxbow, Prehistoric Society Research Paper 7
- Parker Pearson, M. 2007. The Stonehenge Riverside Project: excavations at the east entrance of Durrington Walls. In M. Larsson and M. Parker Pearson (eds) *From Stonehenge to the Baltic: Living with Cultural Diversity in the Third Millennium BC*, 125–44. Oxford: Archaeopress, BAR Int. Series 1692
- Pauketat, T. 2012. *An Archaeology of the Cosmos: Rethinking Agency and Religion in Ancient America*. Oxford and New York: Routledge
- Piggott, S. & Piggott, C.M. 1939. Stone and earth circles in Dorset. *Antiquity* 13, 138–58.
- Pollard, J. 1992. The Sanctuary, Overton Hill, Wiltshire: A re-examination. *Proceedings of the Prehistoric Society* 58, 213–26
- Pollard, J. 2009. The materialization of religious structures in the time of Stonehenge. *Material Religion* 5(3), 332–53
- Pollard, J. 2012. Living with sacred spaces: the henge monuments of Wessex. In A. Gibson (ed.) *Enclosing the Neolithic: Recent Studies in Britain and Europe*, 93–107. Oxford: Archaeopress, BAR Int. Series 2440
- Richards, C. 2013. Interpreting stone circles. In C. Richards (ed) *Building the Great Stone Circles of the North*, 3–30. Oxford: Oxbow Books
- Reimer, P.J., Bard, E., Bayliss, A., Beck, J.W., Blackwell, P., Bronk Ramsey, C., Buck, C. E., Cheng, H., Edwards, R.L., Friedrich, M., Grootes, P.M., Guilderson, T.P., Hafliðason, H., Hajdas, I., Hatté, C., Heaton, T.J., Hoffmann, D.L., Hogg, A.G., Hughen, K.A., Kaiser, K.F., Kromer, B., Manning, S.W., Niu, M., Reimer, R.W., Richards, D.A., Scott, E.M., Southon, J. R., Staff, R.A., Turney, C.S.M. & Plicht, J. van der. 2013. IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP. *Radiocarbon* 55, 1869–87
- Riley, H. & Ridgeway Survey Group 2008. *Long Barrows on the South Dorset Ridgeway: A Survey by English Heritage and the Ridgeway Survey Group*. Swindon: English Heritage Research Report Series 19-2008
- Robb, J. & Pauketat, T. (eds) 2013. *Big Histories, Human Lives*. Santa Fe: School for Advanced Research Press
- Royal Commission on Historic Monuments of England (RCHME) 1970. *An Inventory of Historical Monuments in Dorset, Volume 2, South-East*. London: HMSO
- Rozanski, K., Stichler, W., Gonfiantini, R., Scott, E.M., Beukens, R.P., Kromer, B. & Plicht, J. van der. 1992. The IAEA intercomparison exercise 1990. *Radiocarbon* 34(3), 506–19

- Schweingruber, F.H. 1990. *Microscopic Wood Anatomy: Structural Variability of Stems and Twigs in Recent and Fossil Woods from Central Europe*. Birmensdorf: Swiss Federal Institute for Forest, Snow and Landscape Research, 3rd edition.
- Scott, E.M. 2003. The third international radiocarbon intercomparison (TIRI) and the fourth international radiocarbon (FIR), 1999–2002: results, analysis and conclusions. *Radiocarbon* 45(2), vii–x
- Scott, E.M., Aitchison, T.C., Harkness, D.D., Cook, G.T & Baxter, M.S. 1990. An overview of all three stages of the international radiocarbon comparison. *Radiocarbon* 32(3), 309–19
- Scott, E.M., Cook, G.T. & Naysmith, P. 2010. A report on phase two of the fifth international radiocarbon intercomparison (VIRI). *Radiocarbon* 52(3), 846–58
- Sheridan, A. 2001. Donegore Hill and other Irish Neolithic enclosures: a view from outside. In T. Darvill and J. Thomas (eds), *Neolithic Enclosures in Atlantic Northwest Europe*. Neolithic Studies Group Seminar Papers 6, 171–189. Oxford: Oxbow
- Sheridan, J. A. 2004. Going round in circles? Understanding the Irish Grooved Ware ‘complex’ in its wider context. In H. Roche, E. Grogan, J. Bradley, J. Coles & B. Raftery (eds), *From Megaliths to Metal: Essays in Honour of George Eogan*, 26–37. Oxford. Oxbow
- Smith, R.J.C., Healy, F., Allen, M.J., Morris, E.L., Barnes, I. & Woodward, P.J. 1997. *Excavations Along the Route of the Dorchester By-pass, Dorset, 1986–88*. Salisbury: Wessex Archaeology
- Sparey-Green, C. 1994. Observations on the site of the “Two Barrows”, Fordington Farm, Dorchester; with a note on the “Conquer Barrow”. *Dorset Natural History and Archaeological Society Proceedings* 116, 45–54
- Speak, S. & Burgess, C. 1999. Meldon Bridge: a centre of the third millennium BC in Peebleshire. *Proceedings of the Society of Antiquaries of Scotland* 129, 1–118
- Stuiver, M. & Polach, H.A. 1977. Reporting of ^{14}C data. *Radiocarbon* 19(3), 355–63
- Stuiver, M. & Reimer, P.J. 1993. Extended ^{14}C database and revised CALIB 3.0 ^{14}C calibration program. *Radiocarbon* 35(1), 215–30
- Thomas, J. 1996. *Time, Culture and Identity. An Interpretive Archaeology*. London: Routledge
- Thomas, J. 2004. Materiality and traditions of practice in Neolithic south-west Scotland. In V. Cummings & C. Fowler (eds) *The Neolithic of the Irish Sea: Materiality and Traditions of Practice*, 174–184. Oxford: Oxbow
- Thomas, J. 2015. *Dunragit and Droughduil: A Neolithic Ceremonial Complex in Galloway*. Oxford: Oxbow
- Wainwright, G.J. 1979. *Mount Pleasant, Dorset: Excavations 1970–1 Incorporating an Account of Excavations Undertaken at Woodhenge in 1970*. London: Report of Research Committee of the Society of Antiquaries of London 37
- Wainwright, G.J. 1989. *The Henge Monuments. Ceremony and Society in Prehistoric Britain*. London: Thames & Hudson
- Ward, G.K., & Wilson, S.R. 1978. Procedures for comparing and combining radiocarbon age determinations: a critique. *Archaeometry* 20(1), 19–32
- Warner, R.B. 2000. Keeping out the otherworld: the internal ditch at Navan and the other ‘Iron Age’ hengiform enclosures. *Emania* 18, 39–44
- Wessex Archaeology 2018. *Brewery Square, Dorchester, Dorset: Phase 2C, 3A & 3B Infrastructure Contract Works, Archaeological Watching Brief*. Unpublished report, Wessex Archaeology
- Whittle, A. 1997. *Sacred Mound, Holy Rings, Silbury Hill and the West Kennet Palisade Enclosures: A Later Neolithic Complex in North Wiltshire*. Oxford: Oxbow
- Whittle, A., Healy, F. & Bayliss, A. (eds) 2011. *Gathering Time: dating the early Neolithic enclosures of southern Britain and Ireland*. Oxford: Oxbow
- Woodward, P.J. 1986. Observations along the Wessex Water Authority supply pipe: Allington Avenue and Mount Pleasant. *Dorset Natural History and Archaeological Society Proceedings* 108, 177–80
- Woodward, P.J. 1991. *The South Dorset Ridgeway: survey and excavations 1977–84*. Dorchester: Dorset Natural History and Archaeological Society Monograph Series
- Woodward, P.J., Davies, S.M. & Graham, A.H. 1993. *Excavations at the Old Methodist Chapel and Greyhound Yard, Dorchester, 1981–1984*. Dorchester: Dorset Natural History and Archaeological Society, Monograph 12
- Worley, F. forthcoming. *Marden Henge, Wiltshire: A Reanalysis of the Red Deer Antlers Excavated from Marden Henge in 1969*. Swindon: Historic England Research Department Report Series 20–2011.

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¹ An alternative chronological model for Maiden Castle is presented in Supplementary Information 1 (SI1).

² On the basis of its microscopic anatomical features, wood can only be identified to genus level, not to species. The original identifications for the previous dates, reported as *Q. robur*, have therefore been revised here to *Quercus sp.*

³ We are grateful to an anonymous referee for drawing out attention to the possible of a recut.

⁴ Text in *Courier* denotes OxCal CQLT keywords (<http://c14.arch.ox.ac.uk/>)

⁵ The dating of the enclosure Greyhound Yard will be published shortly.

⁶ Recalculated using IntCal13 (Reimer *et al.* 2013)

Table 1. Mount Pleasant, Dorset: radiocarbon and stable isotope measurements. Replicate measurements have been tested for statistical consistency and combined by taking a weighted mean before calibration as described by Ward & Wilson (1978; $T'(5\%)=3.8$, $v=1$; except where stated).

Laboratory number	Sample reference, material and context	$\delta^{13}\text{C}_{\text{IRMS}}$ (‰)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	$\delta^{15}\text{N}_{\text{IRMS}}$ (‰)	C/N ratio	Radiocarbon age (BP)
Pre-henge activity (western side of enclosure)						
BM-644	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting I. From Layer 9, from below surface of thin fossil soil (OLS) under henge. Associated with 29 sherds of plain Neolithic bowl pottery and two sherds of Grooved Ware (Wainwright 1979, 7, 77, fig 3 (plan) & fig 22 (section)).					4072±73
OxA-35703	XXXII.A. Charcoal, <i>Rhamnus</i> sp., 9 growth rings, strong ring curvature (single fragment; Z Hazell) Cutting XXXII. From Layer 3, top of old land surface beneath henge bank. The bank was well preserved at this point and overlay a 2–5cm thick dark-brown humic loam. This context contained 326 sherds of plain Neolithic pottery and two transverse arrowheads (Wainwright 1979, 7, 81, 141, fig 3 (plan) & fig 4 (section)).	−26.0±0.2				4421±29
UBA-34511	XXXIII.A. Charcoal, <i>Corylus</i> sp., 7 growth rings, weak/no curvature (single fragment; Z Hazell) Cutting XXXIII. From Layer 3, top of old land surface beneath henge bank. The bank was well preserved at this point and overlay a 2–5cm thick dark-brown humic loam (Wainwright 1979, 8, fig 3 (plan) & fig 4 (section)).	−24.3±0.22				4137±36
ETH-86490	XXXIII.C. <i>Corylus avellana</i> shell fragment (Z Hazell) Cutting XXXIII. From Layer 3, top of the old land surface beneath henge bank. The bank was well preserved at this point and overlay a 2–5cm thick dark-brown humic loam (Wainwright 1979, 8, fig 3 (plan) & fig 4 (section)).		−24.2			4070±25
Henge ditch – western entrance						
BM-664	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting II, north terminal pit. From the base of Layer 3, a thick deposit of pale-brown loam interpreted as aeolian material, associated with a single Beaker sherd and a flaked axe (Wainwright 1979, 38, 77, 156, fig 21 (plan) & fig 23 (section)).					3410±130
SUERC-73732	Cutting II: layer 8. AA. Red deer antler, probable pick Cutting II. From Layer 8, a fine dirty silt in the bottom of the ditch which lay under a coarse angular chalk rubble (Layer 7) i.e. very earliest silting (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (sections)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). This large antler pick has wear on the tine, making it likely to be functionally related to the digging of the ditch. It is labelled as being found c. 5cm from ditch bottom but it is not certain whether it was obtained from the north or south terminal.	−22.1±0.2		3.1±0.3	3.3	4108±32

Laboratory number	Sample reference, material and context	$\delta^{13}\text{C}_{\text{IRMS}}$ (‰)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	$\delta^{15}\text{N}_{\text{IRMS}}$ (‰)	C/N ratio	Radiocarbon age (BP)
OxA-35737	Cutting II: layer 8.A. Red deer antler, probable pick Cutting II. From Layer 8, a fine dirty silt in the bottom of the ditch which lay under a coarse angular chalk rubble i.e. very earliest silting (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (section)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). This large antler pick has a tine that shows considerable wear and polish from use, making it likely to be functionally related to the digging of the ditch. Not known whether north or south terminal. A different antler to SUERC-73732.	-21.8±0.2		3.4±0.3	3.2	4055±31
UBA-34291	Cutting II: layer 8.B. Replicate of OxA-35737	-21.4±0.22		3.7±0.15	3.2	4056±35
SUERC-72733	Cutting II: layer 8.C. Replicate of OxA-35737	-21.4±0.2		3.9±0.3	3.3	4057±32
ETH-86493	Cutting II: layer 8.D. Replicate of OxA-35737	-21.4±0.08		3.9±0.08	3.3	4061±31
Weighted mean Cutting II: layer 8: OxA-35737+UBA-34291+ SUERC-72733+ ETH-86493 ^{14}C : 4057±17 BP, $T'=0.0$; $T'(5\%)=7.8$, $v=3$; $\delta^{13}\text{C}$: -21.5±0.7‰, $T'=3.6$; $T'(5\%)=7.8$, $v=3$; $\delta^{15}\text{N}$: 3.8±0.7‰, $T'=3.6$; $T'(5\%)=7.8$, $v=3$						
BM-645	Red deer antler, pick (R A Harcourt) Cutting II, south terminal. From Layer 8, fine dirty silt in the bottom of the ditch which lay under a coarse angular chalk rubble i.e. very earliest silting (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (sections)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). Pick described as resting on the floor of the ditch (Wainwright 1979, 38; Burleigh <i>et al.</i> 1976, 23).					3734±41
BM-646	Red deer antler, pick (R A Harcourt) Cutting II, north terminal. From Layer 8, fine dirty silt in the bottom of the ditch which underlay coarse angular chalk rubble i.e. very earliest silting (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (sections)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). Pick described as resting on the floor of the ditch (Wainwright 1979, 38; Burleigh <i>et al.</i> 1976, 23).					3728±59
OxA-35738	Cutting II (DTN): layer 8: floor of ditch terminal north. Red deer antler, probable pick Cutting II, north terminal. From Layer 8, fine dirty silt in the bottom of the ditch which lay under a coarse angular chalk rubble i.e. very earliest silting. (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (sections)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). Tine shows considerable wear and polish from use, making it likely to be functionally related to the digging of the ditch.	-23.1±0.2		4.6±0.3	3.2	4016±30
ETH-86492	Cutting II (DTN): layer 8: floor of ditch terminal north. B. Red deer antler, probable pick Replicate of OxA-35738	-22.9±0.09		4.9±0.02	3.3	4049±31

Laboratory number	Sample reference, material and context	$\delta^{13}\text{C}_{\text{IRMS}}$ (‰)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	$\delta^{15}\text{N}_{\text{IRMS}}$ (‰)	C/N ratio	Radiocarbon age (BP)
Weighted mean: Cutting II, (DTN): layer 8: ditch floor: OxA-35738+ ETH-86492 ^{14}C : 4032±22 BP, T'=0.6; $\delta^{13}\text{C}$: -22.9±0.08‰, T'=0.8; $\delta^{15}\text{N}$: 4.9±0.01‰, T'=1.0						
Henge ditch – northern entrance						
BM-788	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting XXVIII/XXIX, east terminal. From Layer 6, a compact, light brown loam interpreted as partly aeolian (Wainwright 1979, 45, fig 26 (plan), figs 27 & 28 (sections)) and forming the top of slower silts (Burleigh <i>et al.</i> 1976, 24). Associated with 13 sherds of Grooved Ware pottery, 12 Beaker sherds and 132 Bronze Age sherds (Wainwright 1979, 81).					3506±55
BM-789	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting XXIX, east terminal. From Layer 7, a thick deposit of ashy grey soil (Wainwright 1979, 45, fig 26 (plan), figs 27 & 28 (sections)) and forming the middle part of slower silts (Burleigh <i>et al.</i> 1976, 24). Associated with 3 sherds of Grooved Ware, 2 Beaker sherds and 11 Bronze Age sherds, 1 transverse arrowhead and 1 oblique arrowhead (Wainwright 1979, 81 & 156).					3459±53
BM-790	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting XXVIII/XXIX, east terminal. From Layer 8, a friable ashy grey soil which sealed two infant burials and stake-holes (Wainwright 1979, 44, fig 26 (plan), figs 27 & 28 (sections), forming the lower part of slower silts (Burleigh <i>et al.</i> 1976, 24). Associated with 7 sherds of Grooved Ware and 13 Beaker sherds (Wainwright 1979, 81).					3619±55
OxA-35740	Cutting XXX: burial. Human bone, infant ?left femur (S Mays) Cutting XXX, east terminal. Burial cut from the base of Layer 8 into Layer 9 (Wainwright 1979, 45, fig 26 (plan)). Infant burial (under 1 year old), extremely fragmentary but fully articulated.	-21.4±0.2		11.1±0.3	3.4	2411±28
BM-791	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting XXIX, east terminal. From Layer 10, a fine brown soil interspersed with spills of small chalk rubble and sealing stake-holes (Wainwright 1979, 44, fig 26 (plan), figs 27 & 28 (sections), between rapid and slower silts (Burleigh <i>et al.</i> 1976, 24). Associated with sherds of 1 Neolithic plain bowl, 257 Grooved Ware, 91 Beaker and 1 Bronze Age pot, as well as 2 transverse arrowheads and a polished axe (Wainwright 1979, 81 & 156).					3891±55
BM-792	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting XXVIII/XXIX, east terminal. From Layer 11, small to coarse angular chalk rubble layer representing the earliest silting of the ditch (Wainwright 1979, 44, fig 26 (plan), figs 27 & 28 (sections)), forming rapid silts (Burleigh <i>et al.</i> 1976, 24).					4058±71

Laboratory number	Sample reference, material and context	$\delta^{13}\text{C}_{\text{IRMS}}$ (‰)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	$\delta^{15}\text{N}_{\text{IRMS}}$ (‰)	C/N ratio	Radiocarbon age (BP)
	Associated with sherd of 1 Neolithic plain bowl and 16 sherds of Grooved Ware (Wainwright 1979, 81).					
OxA-35739	Cutting XXIX: layer 11.AA. Red deer antler, probable pick Cutting XXIX, east terminal. From Layer 11, small to coarse angular chalk rubble representing the earliest silting of the ditch (Wainwright 1979, 44, fig 26 (plan), figs 27 & 28 (sections)). Associated with sherd of 1 Neolithic plain bowl and 16 sherds of Grooved Ware (Wainwright 1979, 81). This large antler pick has wear on the tines, making it likely to be functionally connected with the digging of the ditch. It is labelled 'Base of Layer 11, north side.'	-24.0±0.2		3.8±0.3	3.3	4063±30
UBA-34292	Cutting XXIX: Llayer 11.AB. Replicate of OxA-35739	-23.0±0.22		3.6±0.15	3.2	4010±35
ETH-86494	Cutting XXIX: layer 11.AC. Replicate of OxA-35739	-23.1±0.02		3.7±0.05	3.2	4054±31
Weighted mean: Cutting XXIX: layer 11: OxA-35739+ UBA-34292+ ETH-86494 ^{14}C : 4045±19 BP, $T'=1.4$, $T'(5\%)=6.0$, $v=2$; $\delta^{13}\text{C}$: -23.1±0.02‰, $T'=20.3$; $\delta^{15}\text{N}$: 3.7±0.05‰, $T'=0.5$						
SUERC-72738	Cutting XXIX: layer 11B. Red deer antler, probable pick Cutting XXIX, eastern terminal. From Layer 11, small to coarse angular chalk rubble representing the earliest silting of the ditch (Wainwright 1979, 44, fig 26 (plan); figs 27–28 (sections)). Associated with sherd of 1 Neolithic plain bowl and 16 sherds of Grooved Ware (Wainwright 1979, 81). This large antler pick has wear on the tines, making it likely to be functionally related with the digging of the ditch.	-23.1±0.2		5.8±0.3	3.3	4076±30
BM-793	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting XXIX, east terminal. From Layer 12, the lowest ditch layer, a localised deposit of ash and dirty rubble (Wainwright 1979, 44, fig 26 (plan) & fig 28 (section)). Associated with 34 sherds of Grooved Ware (Wainwright 1979, 81).					4048±54
Conquer Barrow						
BM-795	Red deer antler, pick (R A Harcourt) Cutting XLVI. From Layer 9, the lowest primary chalk rubble in the ditch (Wainwright 1979, 67, fig 37 (plan) & fig 38 (section)).					4077±52
Site IV ditch						
OxA-35736	Segment IV: layer 8. Red deer antler, probable pick Segment IV. From Layer 8, a lens of finer silt in the primary chalk rubble in base of ditch (Wainwright 1979, 15, fig 6 (plan) & fig 8 (section, although Layer 8 not depicted)). This antler tine displays wear, making it likely to be functionally related with the digging of the ditch.	-23.6±0.2		6.6±0.3	3.3	4010±30
SUERC-72730	Segment VI: layer 7. Red deer antler, probable pick Segment VI. From Layer 7, primary chalk rubble in base of ditch (Wainwright 1979,	-22.7±0.2		6.1±0.3	3.3	4090±30

Laboratory number	Sample reference, material and context	$\delta^{13}\text{C}_{\text{IRMS}}$ (‰)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	$\delta^{15}\text{N}_{\text{IRMS}}$ (‰)	C/N ratio	Radiocarbon age (BP)
	15, fig 6 (plan) & fig 9 (section)). This large antler pick displays signs of smoothing by use on the handle, making it likely to be functionally related with the digging of the ditch.					
OxA-35735	Segment VIa: layer 7. Red deer antler, probable pick Segment VIa. From Layer 7, buried soil immediately on top of primary chalk rubble in base of ditch (Wainwright 1979, fig 6 (plan); fig 10 (section)). This antler tine displays wear, making it likely to be functionally related with the digging of the ditch.	-23.3±0.2		6.6±0.3	3.2	4035±30
UBA-34289	Segment VII: layer 8. Red deer antler, probable pick Segment VII. From Layer 8, primary chalk rubble in base of ditch (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)). This antler tine displays extreme wear, making it likely to be functionally connected with the digging of the ditch.	-23.4±0.22		5.1±0.15	3.2	3857±38
ETH-86488	Segment VII: layer 8.b. Replicate of UBA-34289		-20.3			3906±30
Weighted mean: Segment VII: layer 8: UBA-34289+ ETH-86488 ^{14}C : 3887±24 BP, $T'=1.0$						
UBA-34290	Segment VII: layer 10.A. Red deer antler, probable pick Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)). This antler displays wear, making it likely to be functionally related with the digging of this pit.	-21.2±0.22		3.5±0.15	3.2	3963±39
SUERC-72731	Segment VII: Layer 10.B. Red deer antler, pick (R A Harcourt) Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)). This antler displays wear, making it likely to be functionally related with the digging of this pit.	-23.1±0.2		5.6±0.3	3.2	4057±32
BM-663	Charcoal, <i>Quercus</i> sp. (G C Morgan) Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)).					3911±89
BM-666	Red deer antler pick (R A Harcourt) Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)).					3941±72
BM-667	Animal bone <i>Bos primigenius</i> (aurochs) limb bone (R A Harcourt) Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary					3988±84

Laboratory number	Sample reference, material and context	$\delta^{13}\text{C}_{\text{IRMS}}$ (‰)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	$\delta^{15}\text{N}_{\text{IRMS}}$ (‰)	C/N ratio	Radiocarbon age (BP)
	chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)).					
BM-669	Charcoal, <i>Quercus</i> sp. (G C Morgan) Segment VIIIa. From hearth on the surface of Layer 5 (Wainwright 1979, 12, 18 & fig 6 (plan)) within upper silts of ditch (Burleigh <i>et al.</i> 1976, 24).					3274±51
BM-668	Charcoal, <i>Quercus</i> sp. (G C Morgan) Segment X of outer ditch, from area of hearth or area of burning and sarsen flakes at the base of Layer 5 (Wainwright 1979, 12, 18, fig 6 (plan) & fig 12 (section)) from secondary silts of ditch (Burleigh <i>et al.</i> 1976, 23).					3630±60
CAR-5	Charcoal (unidentified) From secondary silts of outer ditch, unknown segment. Provided as a check sample for BM-668 so likely same context (Dresser 1985, 340).	-24.7				3890±60
ETH-92535	Seg. XIII, layer 5.1/. Charcoal, <i>Quercus</i> sp. sapwood (D Challinor). Segment XIII. From Layer 5, secondary infilling including a burnt deposit containing quantities of sarsen (Wainwright 1979, 21, fig 6 (plan) & fig 13 (section)).		-23.1			3889±29
ETH-92536	Seg. XIII, layer 5.2/. Charcoal, <i>Maloideae</i> roundwood, moderate–strong curvature (D Challinor). Segment XIII. From Layer 5, secondary infilling including a burnt deposit containing quantities of sarsen (Wainwright 1979, 21, fig 6 (plan) & fig 13 (section)).		-27.0			3871±28
ETH-92537	Seg. XIII, layer 5.3/. Charcoal, <i>Corylus</i> sp. roundwood, moderate–strong curvature (D Challinor). Segment XIII. From Layer 5, secondary infilling including a burnt deposit containing quantities of sarsen (Wainwright 1979, 21, fig 6 (plan) & fig 13 (section)).		-25.1			3856±29
ETH-86487	Segment XIII, Layer 7. Red deer antler, probable pick Segment XIII. From Layer 7, the primary chalk rubble (Wainwright 1979, 21, fig 6 (plan) & fig 13 (section)).	-19.6±0.34		7.1±0.02	3.2	4010±30
Palisade enclosure						
BM-665	Charcoal, <i>Quercus</i> sp. (G C Morgan) Cutting III, west side of enclosure. From Layer 3, a thick layer of ash and charcoal sealing the top of the palisade trench (Wainwright 1979, 58–59, fig 5 (plan) & fig 34 (section)). Associated with 1 sherd of Beaker pottery (Wainwright 1979, 77).					3645±43
OxA-35741	Cutting III: Ditch I: layer 5. Red deer antler, probable pick Cutting III, west side of the enclosure. From Layer 5, packing material around the posts consisting of a hard, rammed puddled chalk layer which extends almost up to ground level (Wainwright 1979, 58–9, fig 5 (plan) & fig 34 (section)). Antler pick shows wear from use, making it likely to be functionally connected with the digging	-23.8±0.2		5.6±0.3	3.3	4010±30

Laboratory number	Sample reference, material and context	$\delta^{13}\text{C}_{\text{IRMS}}$ (‰)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	$\delta^{15}\text{N}_{\text{IRMS}}$ (‰)	C/N ratio	Radiocarbon age (BP)
	of the palisade ditch.					
BM-662	Red deer antler, pick (R A Harcourt) Cutting III, west side of enclosure. From Layer 5, packing material in base of palisade ditch (Wainwright 1979, 58–59, fig 5 (plan) & fig 34 (section)).					3637±63
SUERC-73256	XVI: Post 2: 80–100cm.A. Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 5 growth rings, weak curvature (single fragment; Z Hazell) Cutting XVI, north-west side of enclosure (Wainwright 1979, 60, fig 33 (plan) & fig 35 (section)). From Post 2, sample collected from 80–100cm below ground level (label on bag).	–24.8±0.2				4063±29
OxA-35702	XVI: Post 2: 80–100cm.B. Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 5 growth rings, weak curvature (single fragment; Z Hazell) Cutting XVI, north-west side of enclosure (Wainwright 1979, 60, fig 33 (plan) & fig 35 (section)). From Post 2, sample collected from 80–100cm below ground level (label on bag).	–26.1±0.2				4087±31
SUERC-72734	Cutting XVI: layer 4: 100–150cm. Red deer antler, probable pick Cutting XVI, north-west side of enclosure (Wainwright 1979, 60, fig 33 (plan) & fig 35 (section)). From Layer 4, packing material around the posts, at a depth of 100–150cm below ground level (label attached to antler). Antler pick shows wear from use, making it likely to be functionally related with the digging of the palisade trench.	–23.2±0.2		5.3±0.3	3.3	4048±33
UBA-34293	Cutting XVI: layer 4: 160–170cm. Red deer antler, probable pick Cutting XVI, north-west side of enclosure (Wainwright 1979, 60, fig 33 (plan) & fig 35 (section)). From Layer 4, packing material around the posts, at a depth of 160–170cm below ground level (label attached to antler). Antler pick shows wear from use, making it likely to be functionally related with the digging of the palisade trench.	–23.8±0.22		5.4±0.15	3.2	4042±35
BM-794	Animal bone (domestic <i>Bos</i> sp.) (R A Harcourt) Cutting XVIII, northern side of enclosure including northern entrance (Wainwright 1979, 61, fig 33 (plan) & fig 35 (section)). From Layers 3–6. Described as a ‘selection of the latter [animal bones]’ (Wainwright 1979, 61) so likely a bulk sample.					3956±45
UBA-34294	Cutting XXI: layer 6. Red deer antler, probable pick Cutting XXI, north-west side of enclosure. From Layer 6, the lowest layer within palisade ditch, described as puddled chalk (Wainwright 1979, 50, 62, fig 33 (plan) & fig 36 (section)). Although tines are broken from antler pick, it is a suitable shape and it is likely to be functionally related with the digging of the palisade trench.	–23.3±0.22		4.1±0.15	3.2	3937±50
ETH-86489	Cutting XXI: layer 6.b. Replicate of UBA-34294	–23.5±0.08		4.2±0.12	3.2	3977±31

Laboratory number	Sample reference, material and context	$\delta^{13}\text{C}_{\text{IRMS}}$ (‰)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	$\delta^{15}\text{N}_{\text{IRMS}}$ (‰)	C/N ratio	Radiocarbon age (BP)
Weighted mean: Cutting XXI: layer 6: UBA-34294+ ETH-86489 ^{14}C : 3966±27 BP, $T'=0.5$; $\delta^{13}\text{C}$: -23.5±0.08‰, $T'=0.7$; $\delta^{15}\text{N}$: 4.2±0.09‰, $T'=0.3$						
SUERC-73257	XXII: post 3: 70–90cm.A. Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 6 growth rings, weak/no curvature (single fragment; Z Hazell) Cutting XXII, north-west side of enclosure (Wainwright 1979, 62, fig 3 (plan) & fig 36 (section)). From Post 3, sample collected from 70–90cm below the ground level (label on bag).	-26.2±0.2				4010±29
OxA-35701	XXII: post 3: 70–90cm.B. Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 3 growth rings, weak curvature (single fragment; Z Hazell) Cutting XXII, north-west side of enclosure (Wainwright 1979, 62, fig 3 (plan) & fig 36 (section)). From Post 3, sample collected from 70–90cm below the ground level (label on bag).	-24.8±0.2				4137±29
ETH-86491	Cutting XXII: post 3: 70–90cm.C. Charcoal, <i>Quercus</i> sp. sapwood (no tyloses), 6 growth rings, weak/no curvature (single fragment; Z Hazell) Cutting XXII, north-west side of enclosure (Wainwright 1979, 62, fig 3 (plan) & fig 36 (section)). From Post 3, sample collected from 70–90cm below the ground level (label on bag).		-26.4			3995±25
SUERC-72739	Cutting XXIV: layer 6. Red deer antler, probable pick Cutting XXIV, east side of the enclosure. From Layer 6, the lowest layer of chalk within trench (Wainwright 1979, 63, fig 5 (plan) & fig 36 (section)). Some wear on antler tine suggests it is likely to be functionally related with the digging of the palisade trench.	-21.7±0.2		2.3±0.3	3.3	4078±29
SUERC-73258	XXXVI: south pipe 11.A. Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 6 growth rings, no curvature (single fragment; Z Hazell) Cutting XXXVI, east entrance of enclosure (Wainwright 1979, 63, fig 30 (plan) & fig 31 (section)). From Pipe 11 south (label on bag), collected from unspecified depth below ground level.	-25.0±0.2				4108±29
UBA-34510	XXXVI: south pipe 11.B. Charcoal, <i>Quercus</i> sp., sapwood (no tyloses) 3 growth rings, weak curvature (single fragment; Z Hazell) Cutting XXXVI, east entrance of enclosure (Wainwright 1979, 63, fig 30 (plan) & fig 31 (section)). From Pipe 11 south (label on bag). Collected from unspecified depth below ground level.	-26.1±0.22				4141±29

Table 2. Highest Posterior Density intervals for the dates of key constructional; events at Mount Pleasant, derived from the models shown in Figs 6–10

Parameters	<i>Highest Posterior Density interval (95% probability) cal BC</i>	<i>Highest Posterior Density interval (68% probability) cal BC</i>
<i>BM-795 (Conquer Barrow)</i>	2580–2460	2525–2475
<i>dig_site_IV_ditch</i>	2555–2400	2515–2440
<i>build_palisade</i>	2560–2440	2530–2465
<i>build_henge</i>	2610–2495	2525–2475

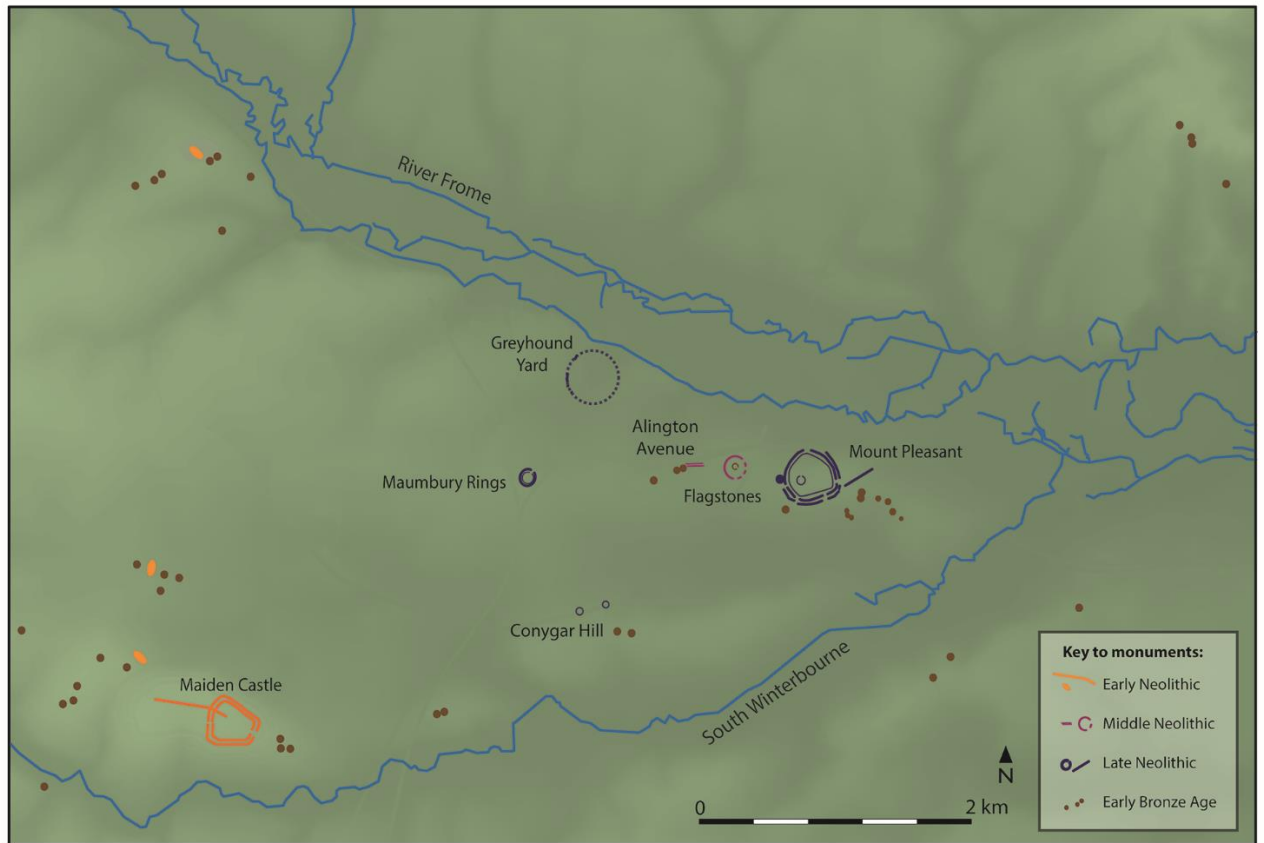


Fig. 1 – A map of Dorchester complex in Dorset showing key Neolithic and early Bronze Age monuments. Lidar imagery from the Environment Agency via Digimap. Contains public sector information licensed under the Open Government Licence v3.0



Fig. 2 – An aerial view of Mount Pleasant henge from the south. FR 198-30, 5th August 1996, © Francesca Radcliffe, with permission of Dorset County Museum

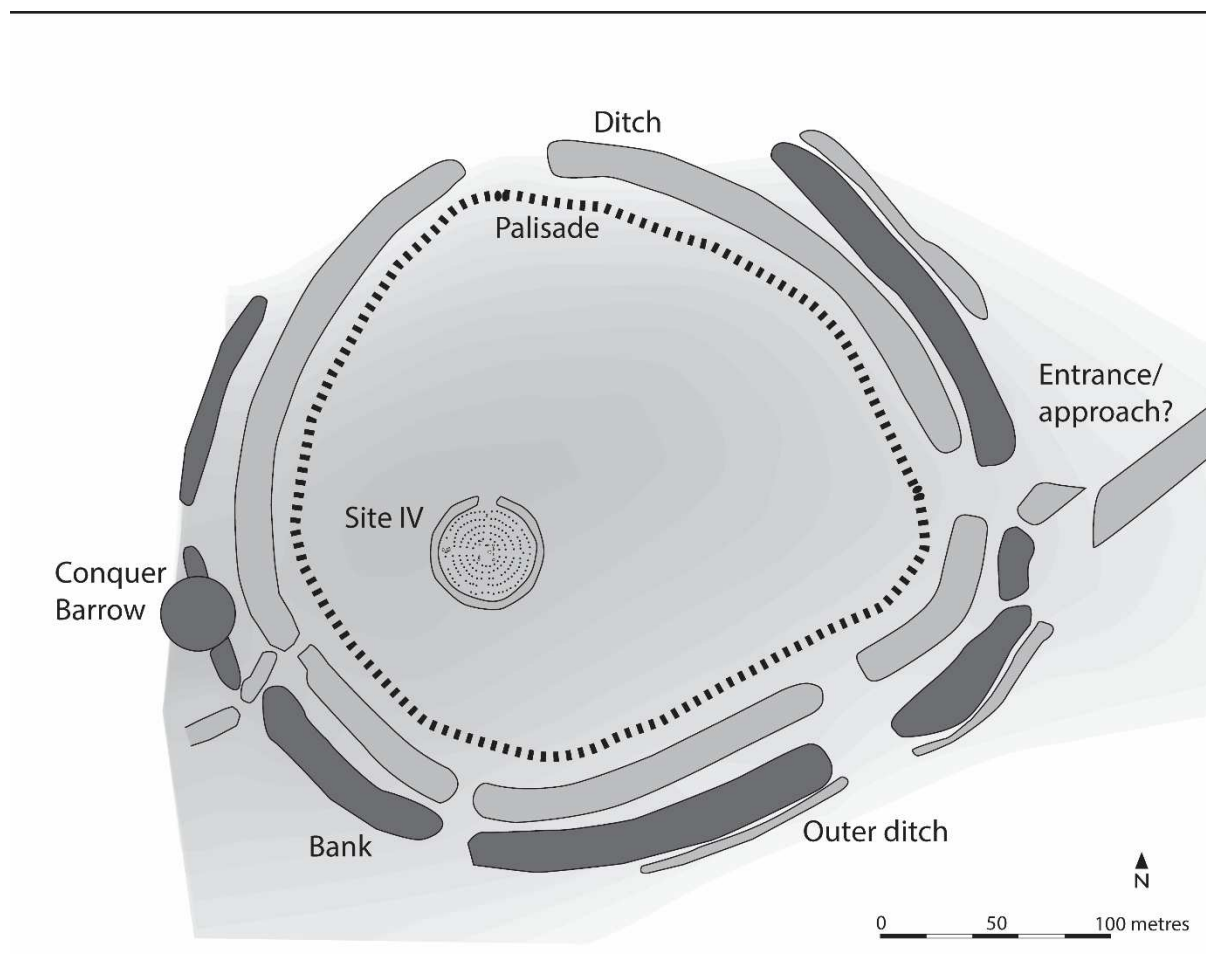


Fig. 3 – Mount Pleasant and Conquer Barrow. After Wainwright (1979, fig. 3) and Barber (2014, fig. 6), with permission



Fig. 4 – Site IV under excavation in 1971. Photograph taken by Peter Sandiford

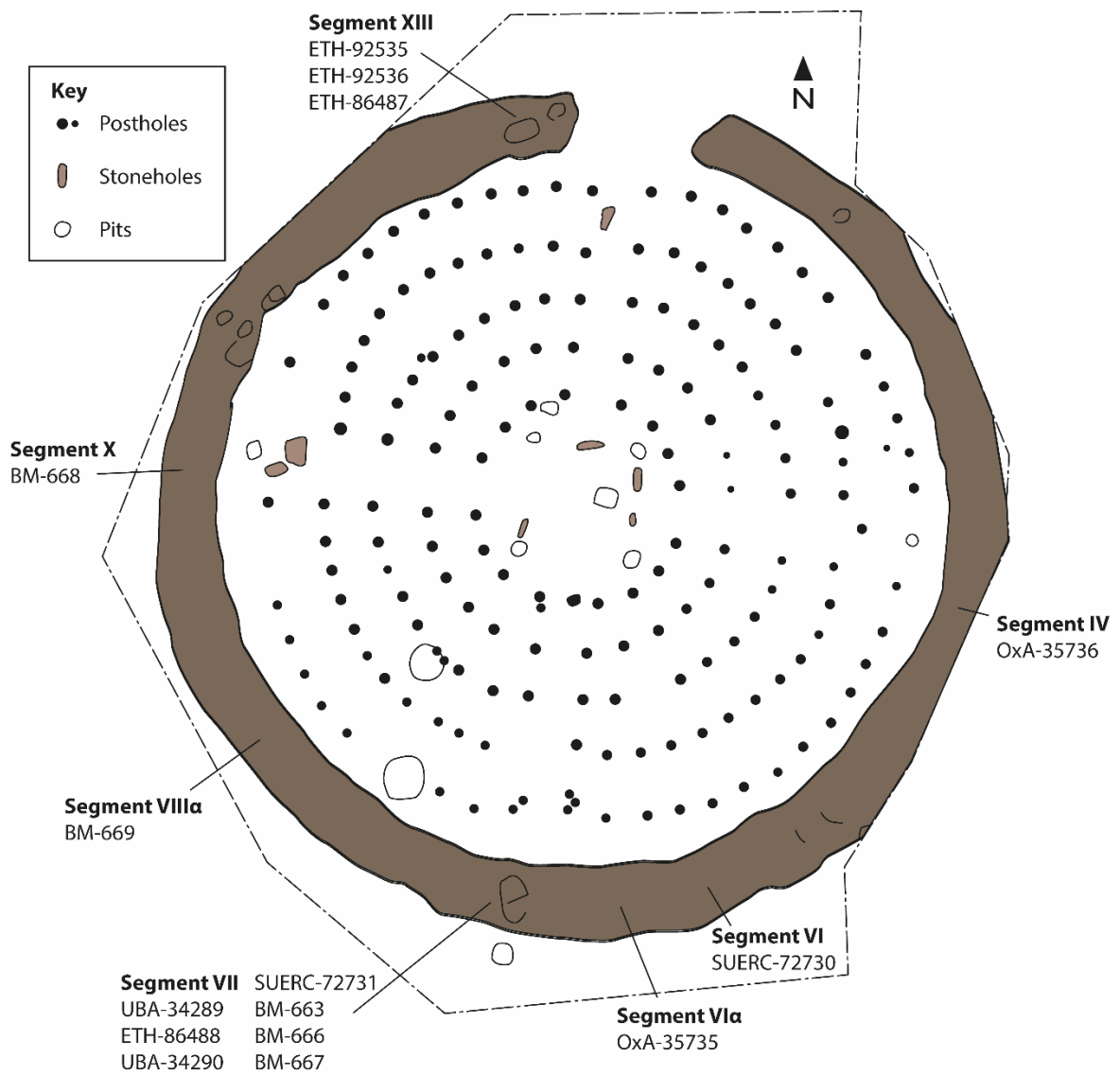


Fig. 5 – Site IV plan. Based on Wainwright (1979, fig. 6).

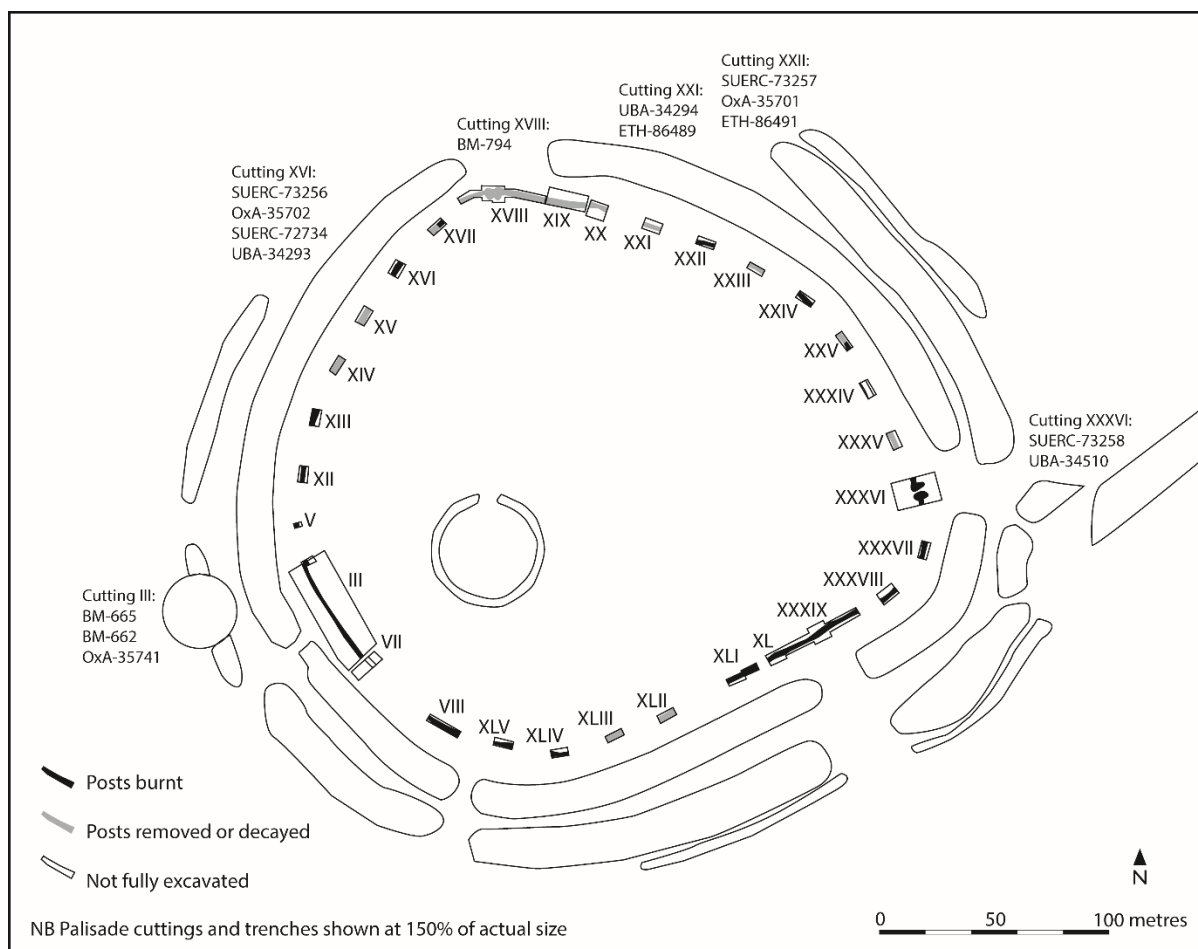


Fig. 6 – Plan of the palisaded enclosure at Mount Pleasant showing patterns of burning, removal or decay or posts, and the location of samples used for radiocarbon dating. Based on Wainwright (1979, fig. 99)

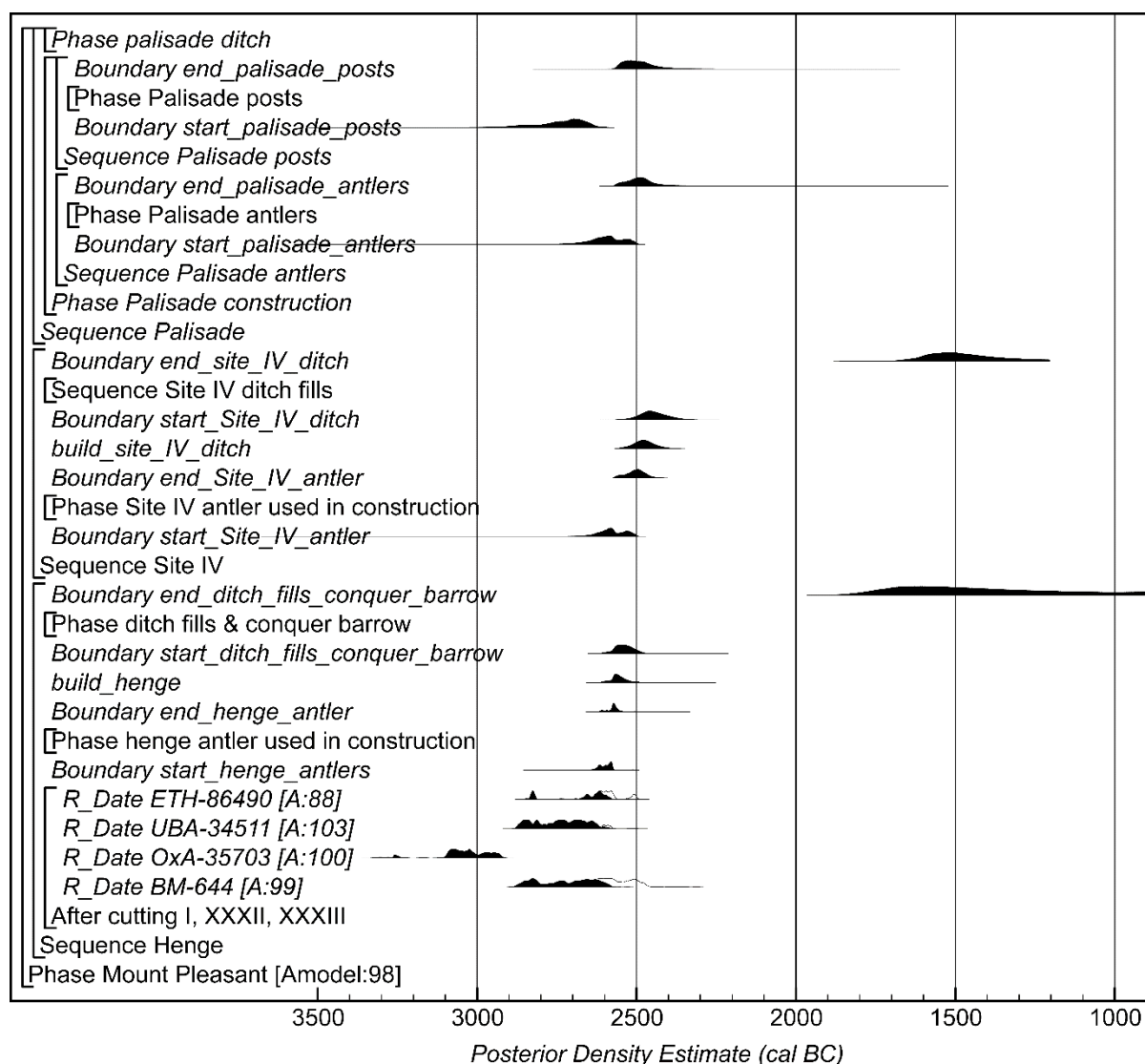


Fig. 7 – Overall structure of the chronological model for activity at Mount Pleasant. The component sections of this model are shown in detail in Figs 7–9. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (<http://c14.arch.ox.ac.uk/>)

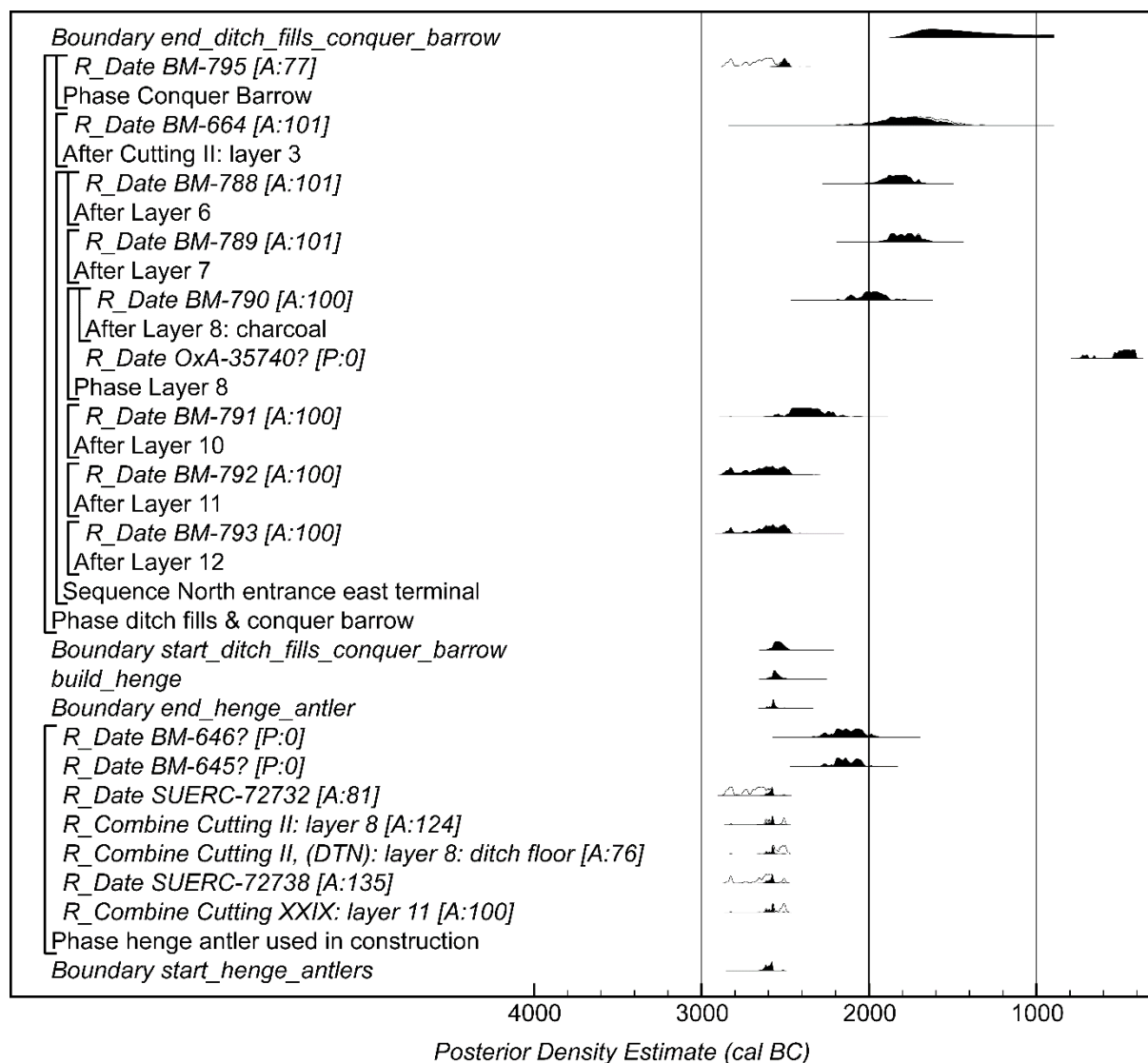


Fig. 8 – Probability distributions of dates from the henge. Each distribution represents the relative probability that an event occurs at a particular time. For each of the dates two distributions have been plotted: one in outline, which is the result of simple radiocarbon calibration, and a solid one, based on the chronological model used. Measurements followed by a question mark have been excluded from the model for the reasons explained in the text and are simple calibrated dates (Stuiver & Reimer 1993). The large square brackets down the left-hand side of Figs 6–9 along with the OxCal keywords define the overall model exactly.

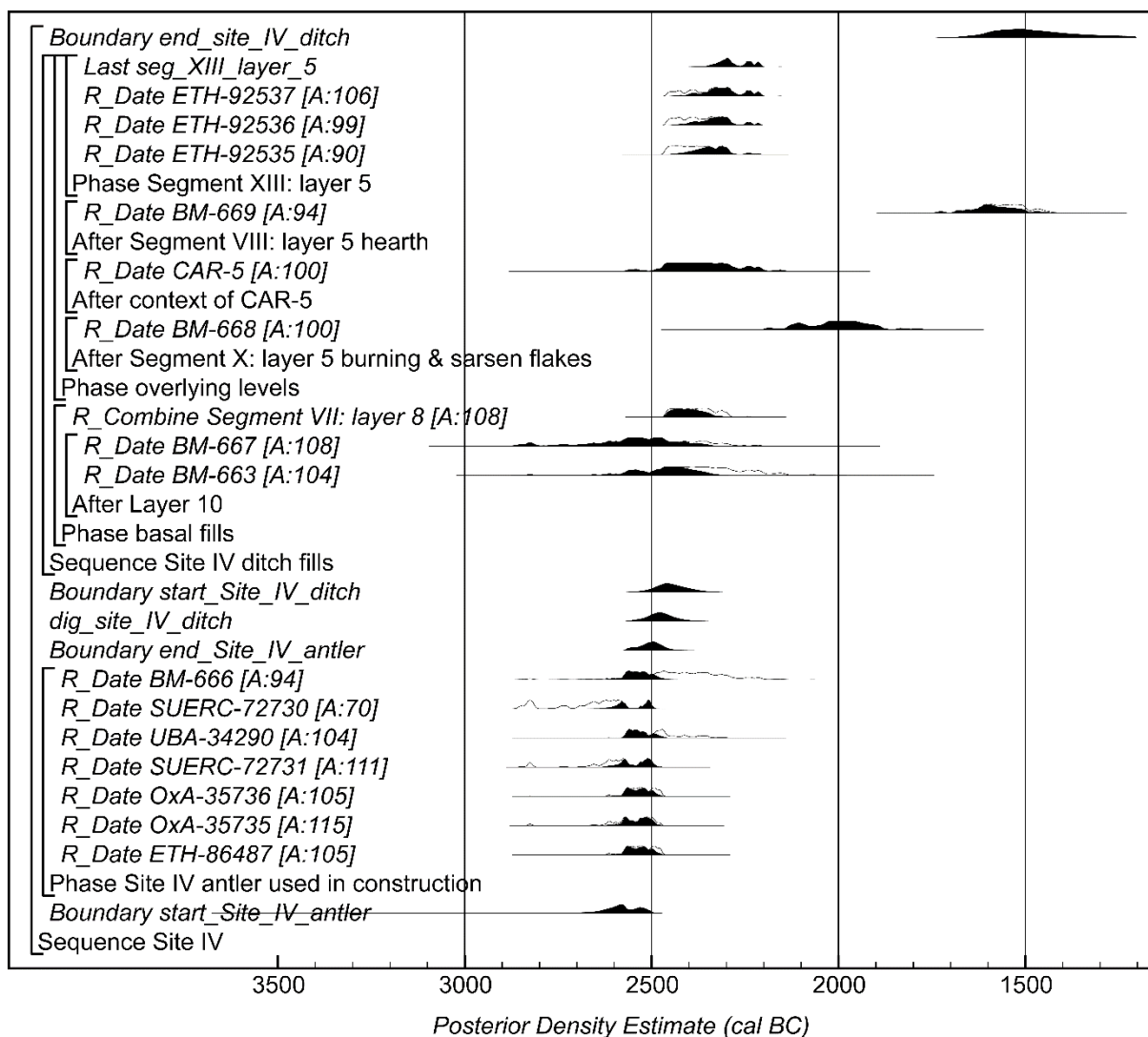


Fig. 9 – Probability distributions of dates from Site IV. The format is identical to that of Fig. 7. The large square brackets down the left-hand side of Figs 6–9 along with the OxCal keywords define the overall model exactly

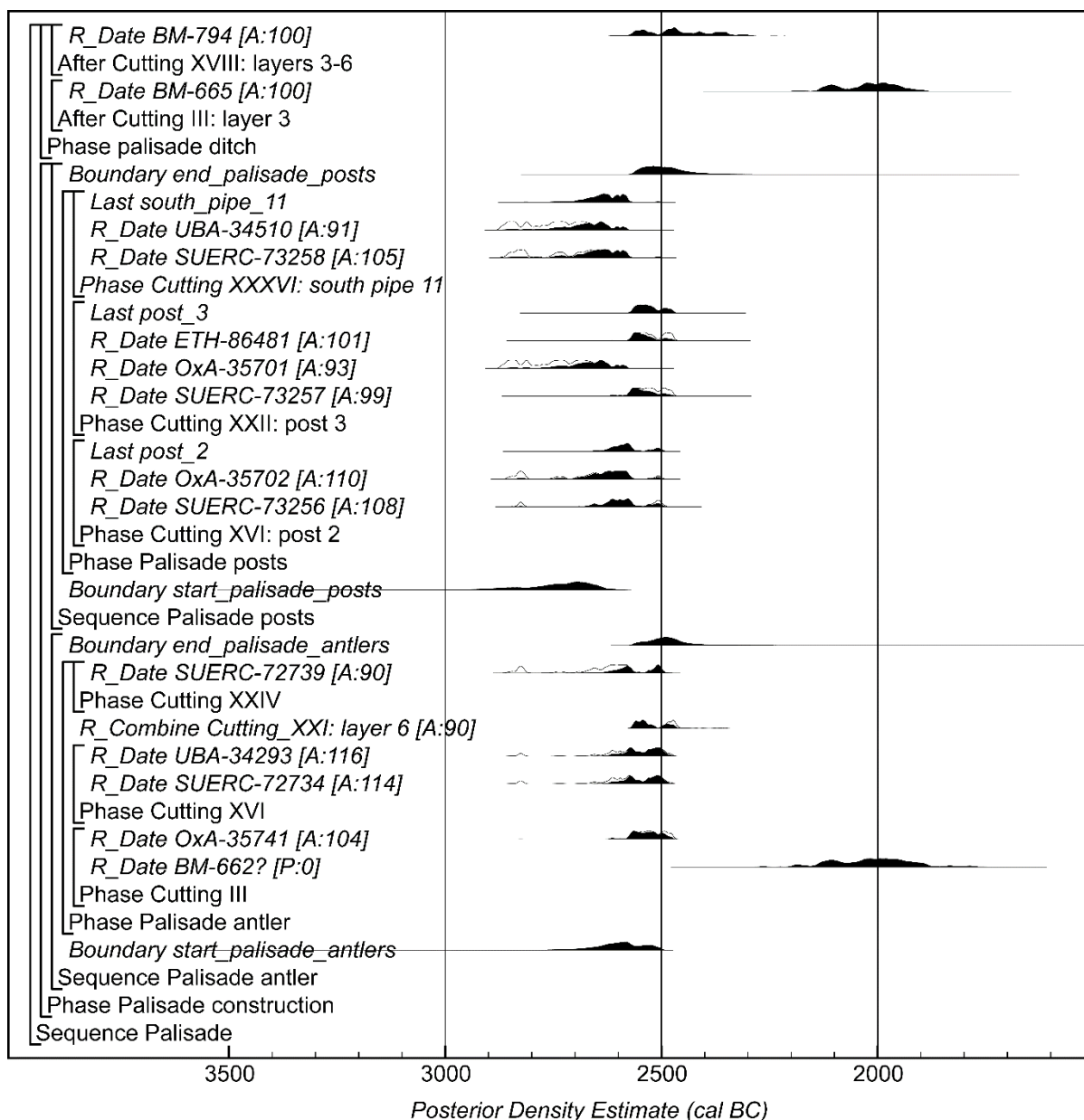


Fig. 10 – Probability distributions of dates from the palisade. The format is identical to that of Fig. 7. The large square brackets down the left-hand side of Figs 6–9 along with the OxCal keywords define the overall model exactly

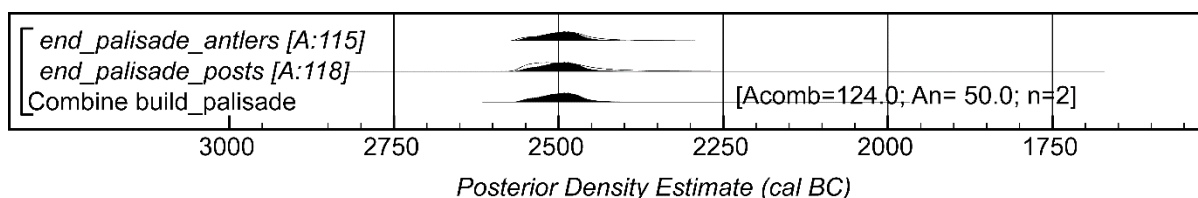


Fig. 11– Combined probability distribution estimating the construction date of the palisade enclosure, if it is interpreted as representing a single planned construction

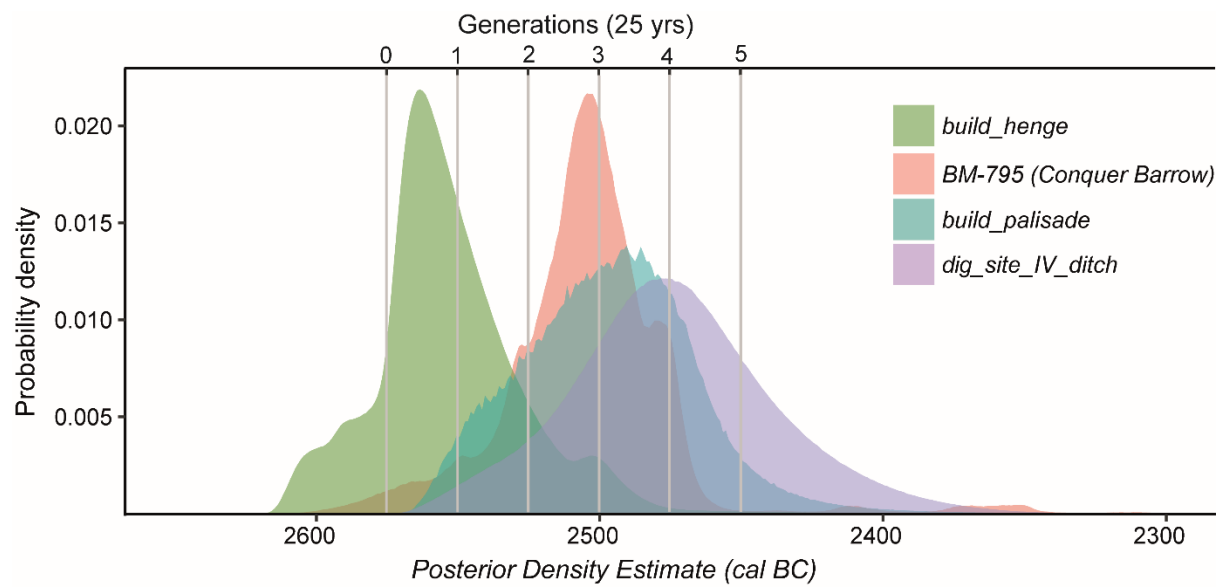


Fig. 12 – Probability distributions of dates of major constructional events (note some of the tails of these distributions have been truncated to enable detailed examination of the highest area of probability)



Fig. 13 – King and Queen. 1991. David Nash. Sculpture, charred oak, 3.55 m tall. Black charred posts against the white slumped chalk of the henge ditches would have formed a dramatic visual impression. © David Nash, with permission.

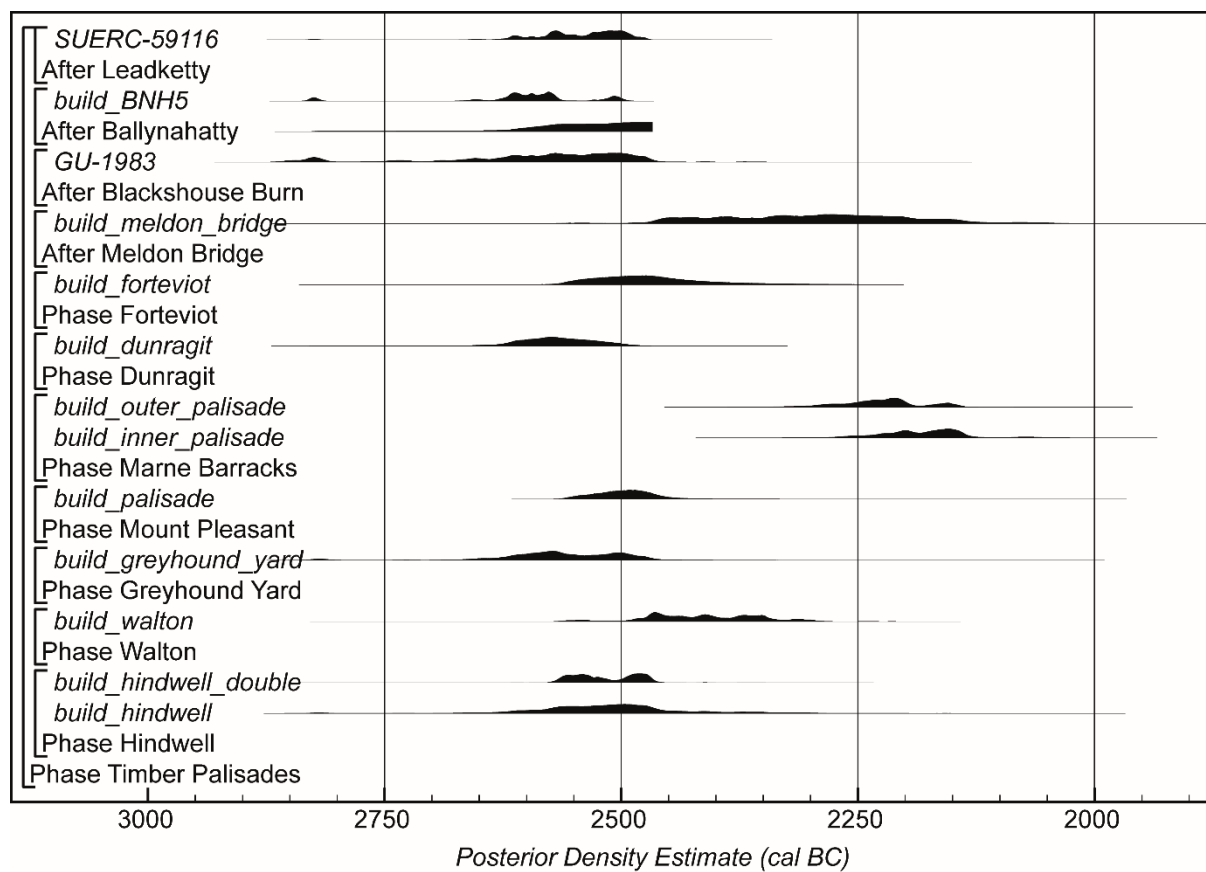


Fig. 14 – Key parameters for palisaded enclosures in Britain, derived from the models defined in Figures 6–9 and SI4.a–d

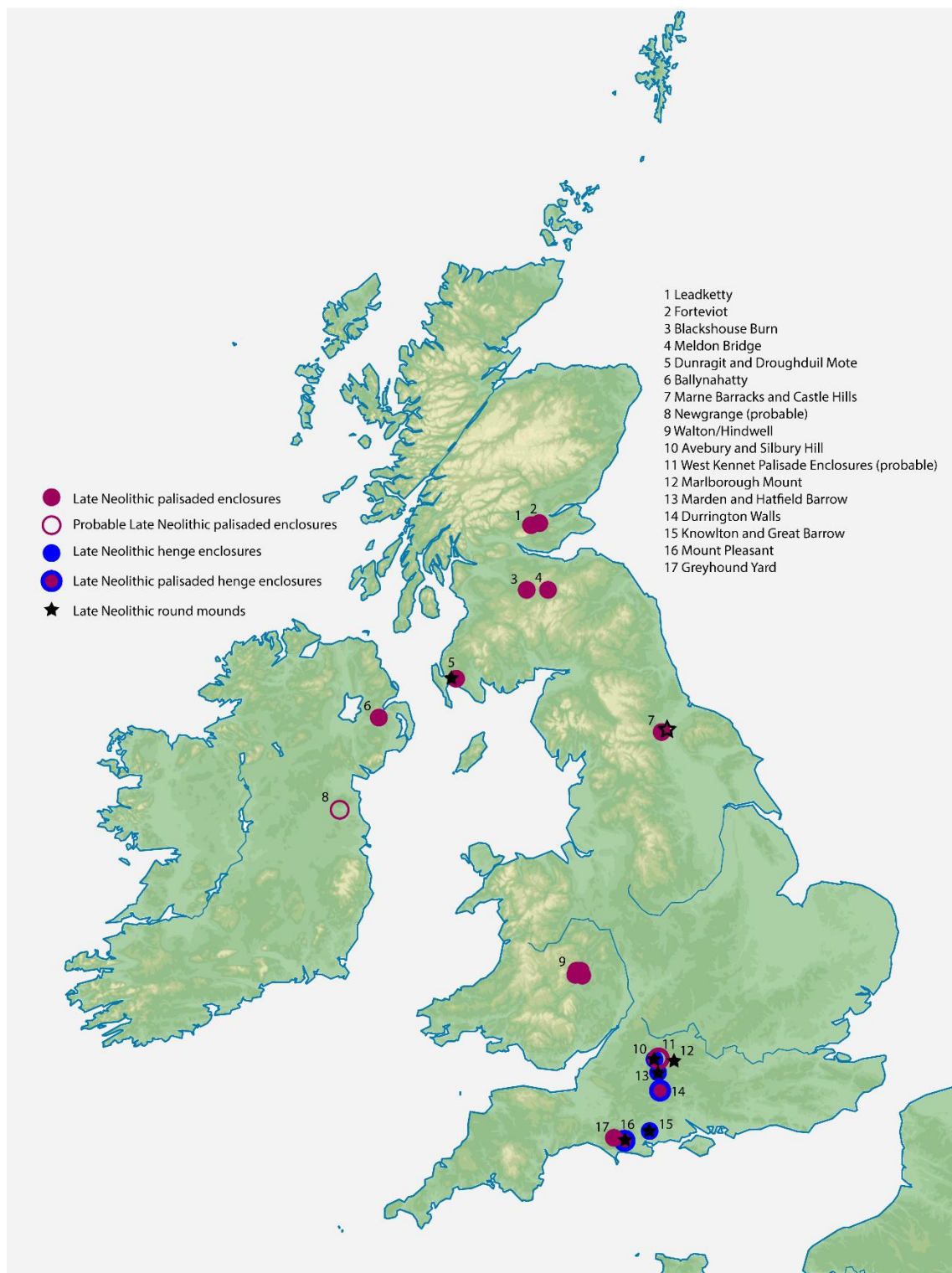


Fig. 15 – Map of the British Isles showing the location of henge enclosures, palisaded enclosures and late Neolithic round mounds. Open symbols denote probable sites.

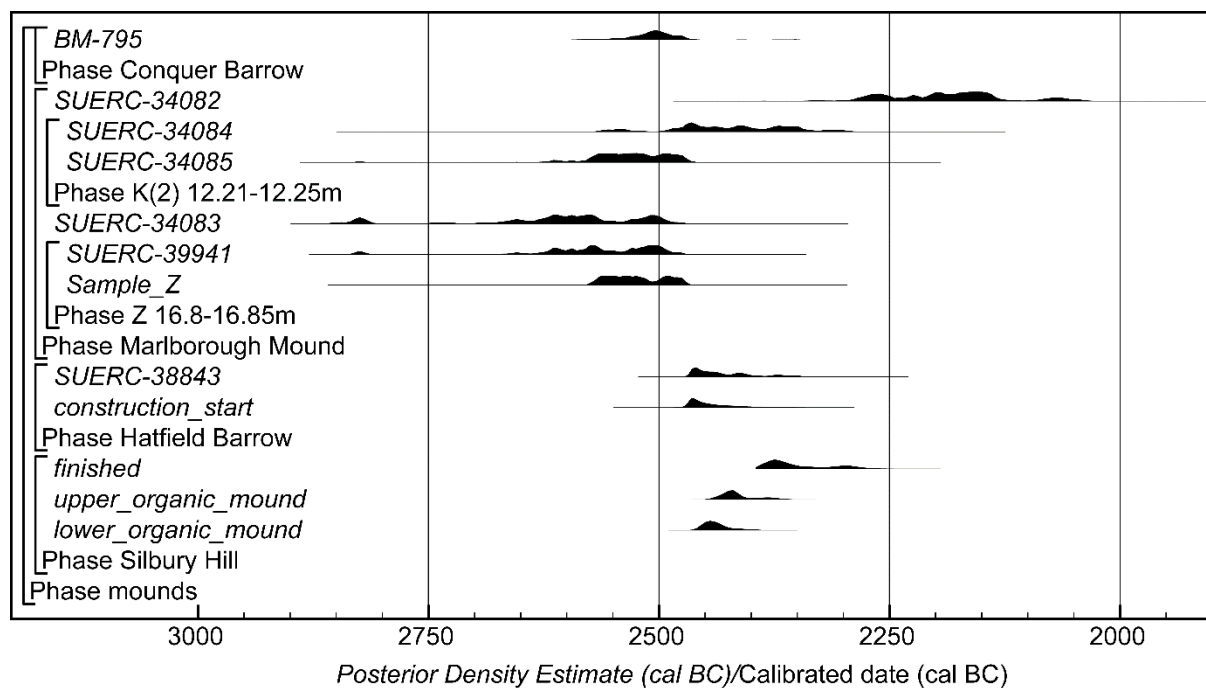


Fig. 16 – Key parameters for late Neolithic round mounds in the British Isle derived from the models defined in Figs 6–9, Marshall *et al.* (2013, fig. 4.5), Leary & Marshall (2012, fig. 3) and Leary *et al.* (2013, fig. 8).

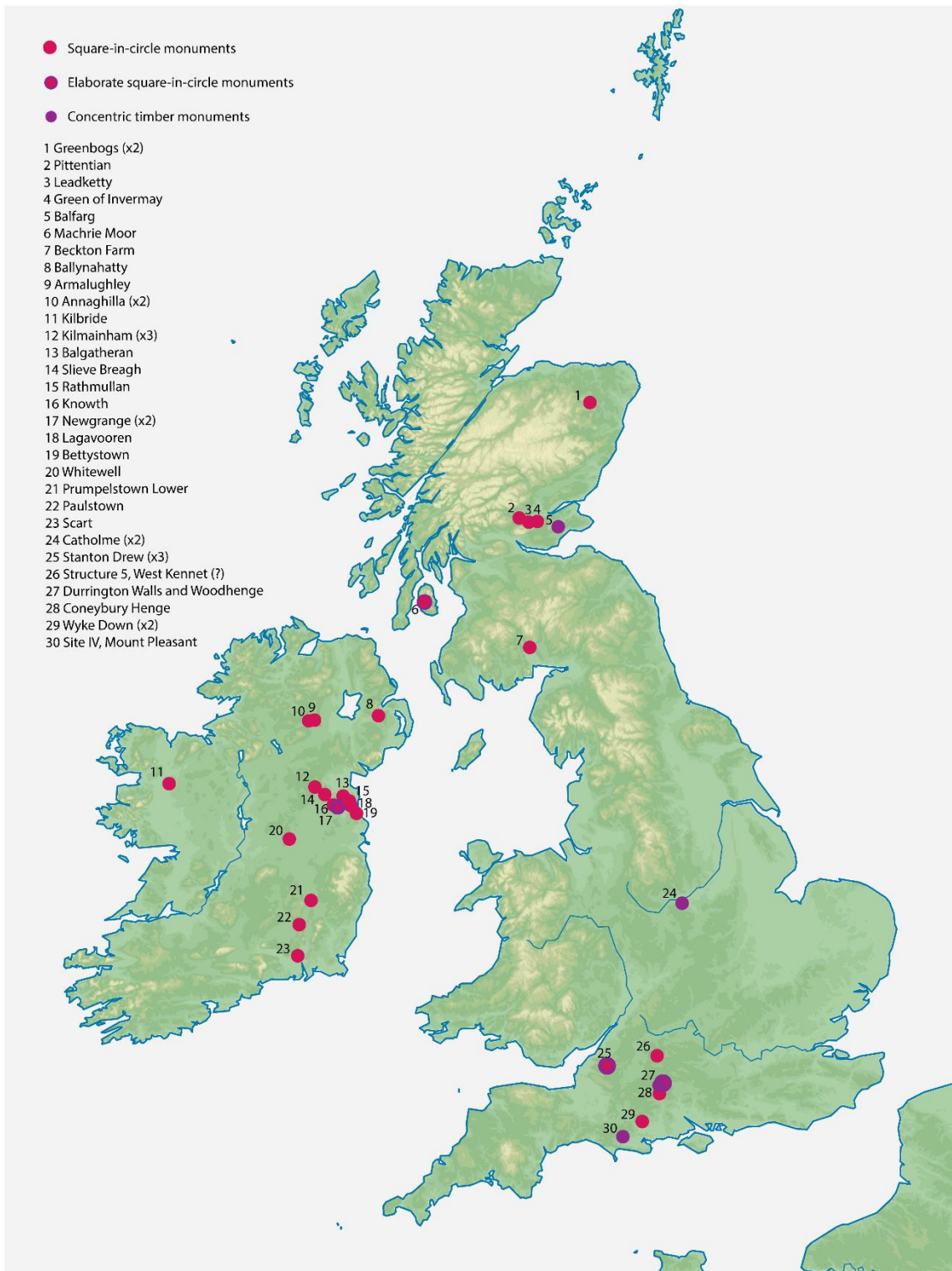


Fig. 17 – Map of the British Isles showing the location of square-in-circle structures and concentric timber circles.

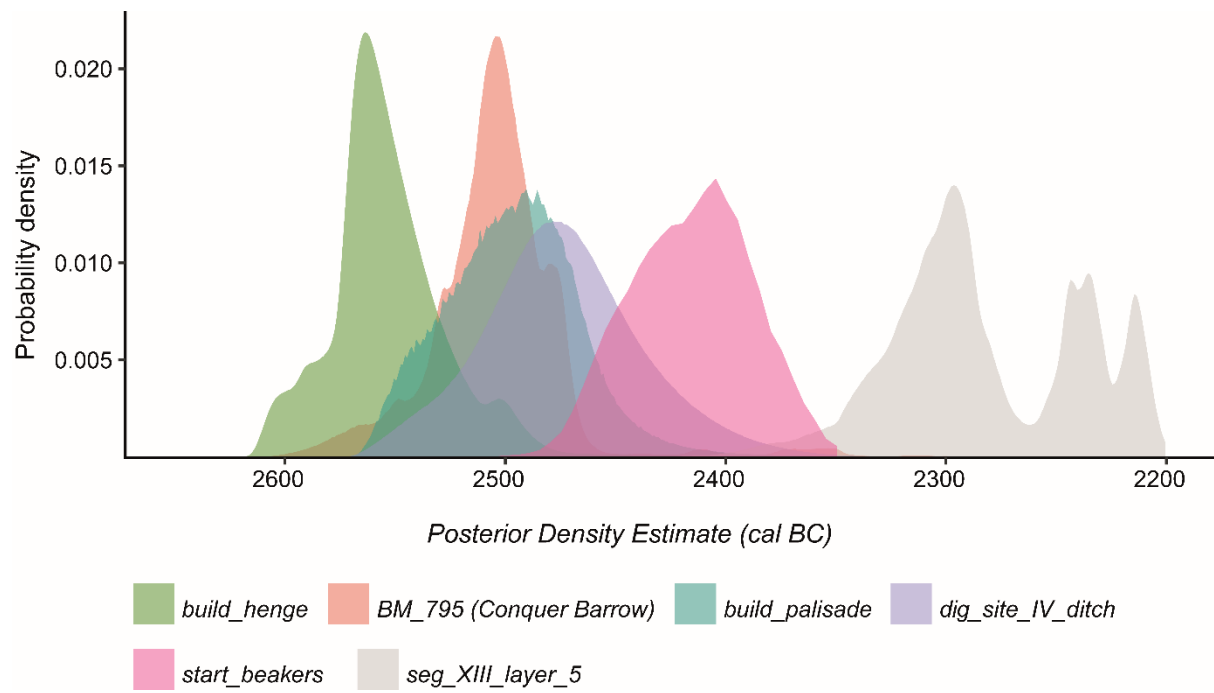


Fig. 18 – Probability distributions of dates of major archaeological events (note some of the tails of these distributions have been truncated to enable detailed examination of the highest area of probability) from Mount Pleasant, and for the first use of Beakers in burials in England (derived from the model described in Jay *et al.* 2019 figs 2.2–2.8).

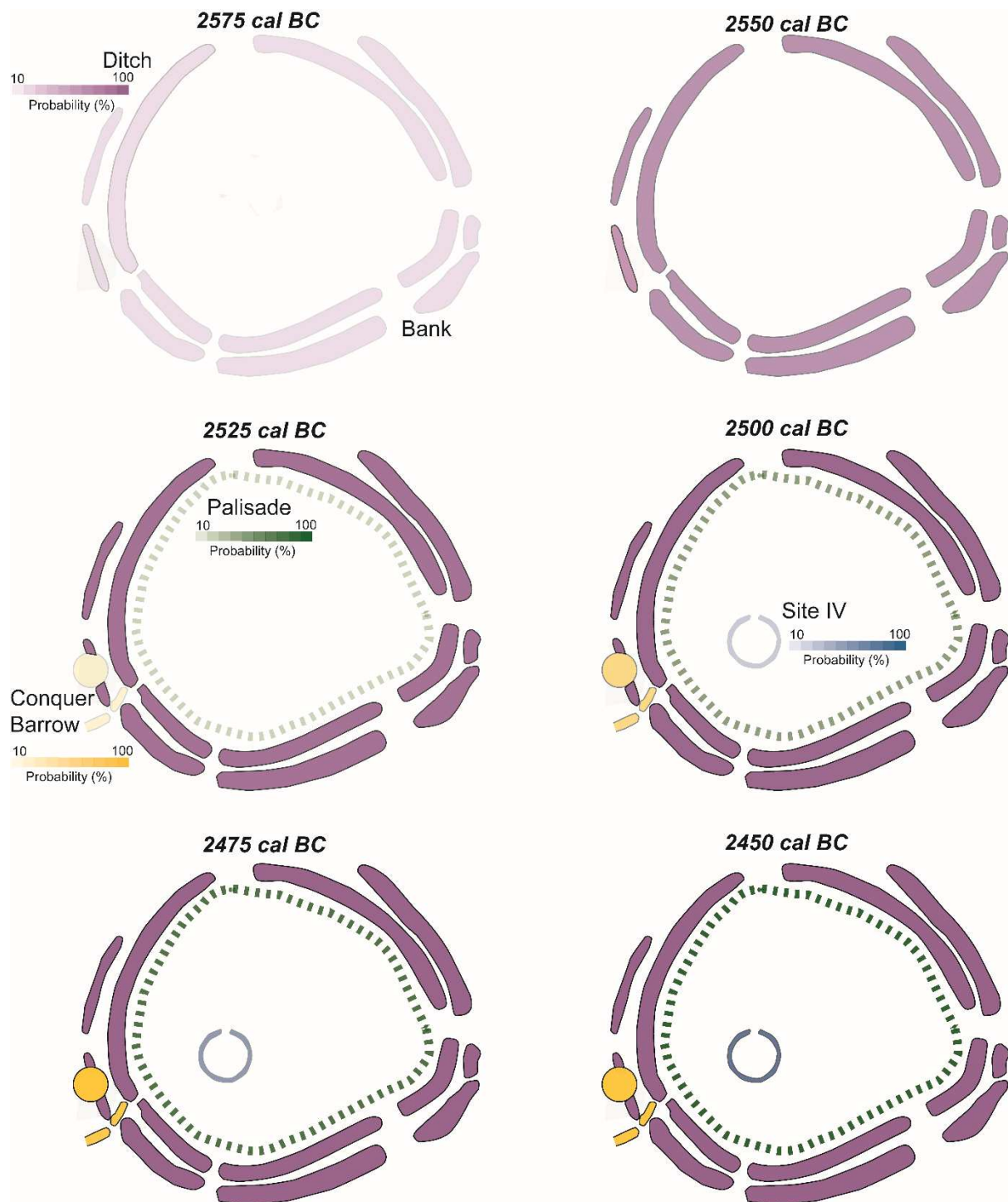


Fig. 19 – The chronological development of Mount Pleasant showing the probability that the henge, Conquer Barrow, palisade and Site IV ditch were constructed in a particular 25 year period (light shading is less probable, darker shading more probable).

